BAOSTEEL

Hot Rolled Steel

热轧产品



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宝山钢铁股份有限公司（简称“宝钢股份”）是中国最大、最现代化的钢铁联合企业。宝钢股份以其诚信、人才、创新、管理、技术诸方面综合优势，奠定了在国际钢铁市场上世界级钢铁联合企业的地位。《世界钢铁业指南》评定宝钢股份在世界钢铁行业的综合竞争力为前三名，认为也是未来最具发展潜力的钢铁企业。

公司专业生产高技术含量、高附加值的钢铁产品。在汽车用钢，造船用钢，油、气开采和输送用钢，家电用钢，电工器材用钢，锅炉和压力容器用钢，食品、饮料等包装用钢，金属制品用钢，不锈钢，特种材料用钢以及高等级建筑用钢等领域，宝钢股份在成为中国市场主要钢材供应商的同时，产品出口日本、韩国、欧美四十多个国家和地区。

公司全部装备技术建立在当代钢铁冶炼、冷热加工、液压传感、电子控制、计算机和信息通讯等先进技术的基础上，具有大型化、连续化、自动化的特点。通过引进并对其不断进行技术改造，保持着世界最先进的技术水平。

公司采用国际先进的质量管理，主要产品均获得国际权威机构认可。通过BSI英国标准协会ISO9001认证和复审，获美国API会标、日本JIS认可证书，通过TS 16949认证，得到中国、法国、美国、英国、德国、挪威、意大利、日本、韩国等九国船级社认可。

公司具有雄厚的研发实力，从事新技术、新产品、新工艺、新装备的开发研制，为公司积聚了不竭的发展动力。

公司重视环境保护，追求可持续发展，在中国冶金行业第一家通过 ISO14001 环境贯标认证，堪称世界上最美丽的钢铁企业。

宝山钢铁股份有限公司拥有多个钢铁生产基地。热轧产品的生产集中在股份总部、股份不锈钢事业部以及子公司上海梅山钢铁股份有限公司。



Baoshan Iron & Steel Co., Ltd (hereinafter referred as Baosteel Co., Ltd.) is the largest and most advanced integrated steel company in China. By means of leveraging comprehensive advantages such as good faith, talents, innovation, management, and technology, Baosteel Co., Ltd is also recognized as a world leading steel company by the global steel market. According to World Steel Dynamics, the company ranks No. 3 in the world in terms of comprehensive competency; it is also believed to have the greatest development potential.

The company specializes in producing high-tech and high value-added steel products. It has become the main steel supplier to the industries of automobile, household appliances, oil exploration, oil and gas transmission, shipbuilding, pressure vessel and container materials in China. Meanwhile, Baosteel also exports its products to over forty countries and regions including Japan, South Korea, the United States and European Union.

All the equipments the company possesses are based on the advanced technologies of modern steel smelting, cold and hot rolling processing, hydraulic sensing, real-time detection, electronic control, computer and information communications. They feature large-scale, continuity and automation and keep the most advanced technology in the world through constant technical modification and innovation.

The company adopts advanced quality management system in the world and its main products are recognized by the international authoritative institutions. They received ISO9001 certification from BSI (British Standards Institution). They were allowed to use the emblem of API (American Petroleum Institute). They obtained a certificate from JIS in Japan and passed the certification of TS 16949. Baosteel`s products have also obtained recognition by seven classification societies of China, France, America, Britain, Germany, Norway and Italy.

The company boosts strong capacity in R&D of new technology, new products and new equipments, with a view to accumulate sustainable power of development.

The company attaches great importance to environment protection, and sustainable development. It is the first one among Chinese metallic companies to obtain ISO 14001 environment certification. Baosteel is called as the most beautiful plant in the world.

Baosteel has many manufacturing bases. Most of the Hot-rolled products are produced in the core base or stainless steel branch of Baoshan Iron & Steel Co., Ltd, or in Shanghai Meishan Iron and Steel Co., Limited.

宝山钢铁股份有限公司 总部
Core Base, Baosteel



位于上海东北翼，是全球最大的长流程钢铁制造基地之一。年产钢能力超1450万吨。

2050热连轧产线

2050mm热轧机于1989年投入生产，设计年产量450万吨。主体设备由德国西马克、西门子等公司成套提供，包括四座大型步进式加热炉，四架带立辊的粗轧机，一台连杆切头飞剪，七架四辊式精轧机，三台地下液压卷取机等设备。2050热轧生产品种有：低碳钢、结构钢板、汽车结构钢板、船体结构钢板、耐腐蚀结构钢板、机械结构钢板、压力容器用钢、管线用钢等。 极限供货规格为厚度1.2～25.4mm，宽度600～1900mm。

1580热连轧产线

1580mm热轧机组于96年建成投产，设计产量280万吨。主体设备由日本三菱引进。该设备采用了当时世界领先的定宽侧压机，边部加热器、PC轧机等多项新技术。1580的热轧产品主要供公司内冷轧原料使用，其余为热轧商品材，主要品种有热轧低碳钢、结构钢、钢管用带钢、机械结构用钢、汽车结构用钢、集装箱用钢、镀锡板用热轧钢卷等。极限供货规格为厚度1.5～12.7mm，宽度700～1430mm。

1880热连轧产线

1880mm热轧机组是宝钢“十一五”规划重要项目之一，于2007年3月正式投产，设计年产量370万吨。轧线主体机械设备由日本三菱日立（MH）设计，设备由宝菱重工提供。除常规产品外，机组具有的快速冷却、低温卷取等技术是其适合生产高强钢和各类先进钢。极限供货规格为厚度1.5～12.7mm，宽度700～1730mm。

Located in the north-east of shanghai, the Core Base of Baosteel is one of the largest steel processing bases in the world. The annual capacity is more than 14.5 million tons.

2050 hot rolling line

Line 2050 is named by the length of the roller. It initialed its production in 1989. The designed capacity was 4.5 million tons per year. The main sets of the equipments were provided by SMS group and Siemens, etc., including 4 walking beam furnaces, 4 rough rolling mills with vertical rollers, 1 flying shear, 7 stand four-high finishing mill and 3 underground coiling machines. The main products from line 2050 cover low carbon steel, structure steel, automobile structural steel, marine steel, anti-corrosion steel, machinery steel, pressure vessel steel and pipe steel. For line 2050, the nominal thickness is from 1.2mm to 25.4mm. The nominal width is from 600mm to 1900m.

1580 hot rolling line

Hot rolling line 1580 went in to operation in 1996. The designed capacity was 2.8 million tons per year and reached 4.05 million tons in 2007. The main set of equipments were from Mitsubishi. The line adopted the advanced technologies at that time, such as fixed side pressure machine, edge heater and PC mill. Most of the coils from line 1580 are the raw material for cold-rolled product in Baosteel. The rest products are low carbon steel, structural steel, marine container steel, TMBP(tin mill black plate).For line 1580, the nominal thickness is from 1.5mm to 12.7mm. The nominal width is from 700mm to 1430mm.

1880 hot rolling line

Hot rolling line 1880 is an important project for Baosteel during the eleventh fiveyear plan in China. It went into operation in March, 2007. The designed capacity is 3.7 million tons each year. The main equipment in the line was designed by Mitsubishi-Hitachi and provided by Baoling Heavy & Industrial Machinery Co., Ltd. With the rapid cooling and low-temperature coiling technologies applied, this line is suitable for extreme high strength steel and advanced steel in addition to conventional products. The nominal thickness is from 1.5mm to 12.7mm. The nominal width is from 700mm to 1730mm.



宝山钢铁股份有限公司 不锈钢事业部
Stainless Steel Business Unit, Baosteel

位于上海市宝山区，拥有炼铁、炼钢、热轧、冷轧等配套完整的、不锈钢和碳钢联合生产线。



1780热连轧产线

1780产线建设始于2001年，2004年4月全面建成投产。该产线是一条不锈钢和碳钢联合生产线，年设计钢产能257万吨。
该生产线可生产奥氏体，铁素体，马氏体，双相钢等不锈钢钢种，并具备不断开发新钢种的能力。1780mm热轧带钢轧机以热轧不锈钢卷为主导产品，同时发挥轧机能力大，控制水平高的特点，兼顾生产薄规格，高强度，高附加值的优质碳素结构钢、低合金钢等碳钢产品。

Located in Baoshan district, Shanghai, the stainless steel branch has a complete production line from iron making, steelmaking, hot-rolling to cold-rolling process. It is a manufacture base for stainless steel and carbon steel.

Hot rolling line 1780

The hot rolling line 1780 started its construction in 2001 and went into operation in April, 2004. This line is suitable for both stainless steel and carbon steel. The designed capacity is 2.57 million tons each year.
This line is suitable for austenite, ferrite, martensite and dual-phase stainless steel. With good control system and process ability, this line can also manufacture carbon steel, even thin thickness and high strength carbon steel.

上海梅山钢铁股份有限公司
Shanghai Meishan Iron & Steel Co., Ltd



上海梅山钢铁股份有限公司是宝钢股份公司控股的子公司，位于南京市西南郊。公司始建于1969年4月，经过三十多年的发展，已成为集炼焦、烧结、炼铁、炼钢、轧钢为一体的钢铁联合企业。至2006年底，公司总 资产120.66亿元。

1422热连轧产线

1422产线于1994年建成投产，主体设备引进自新日铁1422mm，采用美国AEG公司计算机控制系统。经过多次技术改造，现已形成350万吨优质热卷的年生产能力。产品包括低碳冷成型用钢、结构用钢、汽车用钢、耐腐蚀用钢、管线用钢、直缝焊管用钢、焊瓶用钢、花纹钢板等各品种。



Shanghai Meishan Iron & Steel Co.,Ltd., a holding company of Baosteel Iron & Steel Co., Ltd., is located in the southwest suburb of Nanjing city. The company was founded in April 1969. It has become an iron and steel complex covering coking, sintering, iron making, steel making and hot rolling after more than 30 years development. By the end of 2006, the total assets of the company had reached RMB 12.066 billion.

Hot rolling line 1422

The hot rolling line 1422 went into operation in 1994. The main equipments were imported from NSC, and the control system was from AEG. After several modifications, the capacity of this line reached 3.5 million tons per year. The main products cover low carbon steel, structural steel, automobile steel, anti-corrosion steel, pipe steel, gas cylinder steel and checker plates.

热轧产品
Hot-rolled products



宝钢热连轧产品具有强度高，韧性好，易于加工成型及良好的可焊接性等优良性能，被广泛应用于船舶、汽车、桥梁、建筑、机械、压力容器等制造行业。

产品主要包括以下类别：

冷成型用钢

产品应用广泛，用于制作齿轮 、电气仪表箱、千斤顶外壳、轮圈、轮盘、压缩机外壳等一般性加工零件组等。

结构钢板

产品广泛用于建筑结构、桥梁、船舶、铁路车辆、管道大型机械及其它结构件等。

汽车结构用钢

产品主要用于汽车大梁、横梁、车轮、车底盘零件等。

耐腐蚀结构用钢

产品主要用于石油井架、海港建筑、采油平台、船舶、车辆、化工、石油设备中含硫化氢腐蚀介质的容器等。

机械结构钢板

产品韧性和耐磨性优，主要用于链条、打捆机、园艺工具等。

焊接气瓶及压力容器用钢

产品主要用于蒸汽锅炉设备、焊接气瓶及较高工作温度的压力容器。

管线用钢

产品主要用于通过螺旋焊接、直缝焊接等工艺制造石油、天然气远程输送管线。



With high strength, good toughness, easy processability and excellent welding performance, the hot-rolled products of Baosteel are widely used in various industries, such as marine, automobile, bridge, construction and pressure vessels.

The Hot-rolled products cover:

Cold forming steel

Widely used, suitable for parts with common formability requirement, such as gear case, electric device, jack shell, collar rim, wheel dish and compressor case.

Structural steel

Widely used in architecture, bridge construction, marine craft, railway locomotive, heavy machine and other structure parts.

Automobile structural steel

Mainly used to make beam, crossing beam, wheel and other chassis parts .

Anti-corrosion steel

Mainly used to make oil derrick, seaside construction, oil extraction platform, marine craft, vehicle, container for sulfurate substance in oil and chemical industries.

Machinery structural steel

With good toughness and wearablity , suitable for chain, pack machine and gardening tools.

Welding cylinder and pressure vessel steel

Suitable for steam boiler equipments, welding cylinder and pressure vessel with high working temperature.

Pipeline steel

Mainly used to make spiral welded or straight welded pipe for petroleum or natural gas.

热轧产品交货状态分为：

卷状交货：

1、直发卷：钢卷轧制之后未经其他处理，直接交货。

2、平整卷：轧制后的钢卷经过平整机组平整可以消除屈服平台，不容易出现腰折。同时平整时可以去除头尾和不良部分、改善表面和板形，调整卷重。平整卷最厚规格为6mm。

3、分卷：轧制后的钢卷经过分卷机组矫直，去除头尾和不良部分，可以改善表面和板形。分卷时可以进行切边，也可以将大卷切分成数个小卷。分卷最厚规格为12.7mm。

4、纵切卷：轧制后的钢卷经过纵切机组纵切，可以将一个卷分出几个较窄的钢卷。纵切最厚规格为12.7mm。

板状交货：

轧制后的钢卷切板，并经过多道次的平整和矫直，以及细致的检查与剔除缺陷，因而具有更好的板形与表面质量。钢板可以毛边交货，也可以切边交货。

板状交货的钢材可以选择两种包装方式。一是普通包装，钢板表面裸露，通过捆带捆扎；另一种是盒式包装，钢板用防锈纸包裹，侧面、顶面用侧护板和上盖板保护，底下装有垫木和托架。如果用户对钢板的表面质量有很高要求，请选择盒式包装，以避免运输仓储过程中造成生锈、划伤等缺陷。

不锈钢、梅钢由于未装备切板线，因此不能提供板状交货。

The delivery condition for Hot-rolled steels:

In coils:

1. As rolled: the coils will be delivered after rolling process without any other treatment.

2. Skin passed: the rolled coils will be skin-passed in order to remove the yield point jog and avoid the stretcher strains. During the skin-pass process, the defective section of the coil, such as tongue or tail, will be cut off. The shape and surface quality of the coil will be improved. For the skin-passed coils, the maximum available thickness is 6mm.

3. Cut-coil: the rolled coils will be leveled and the defective section will be removed. the coil can be delivered cut-edge if needed. For the cut-coil, the maximum thickness is 12.7mm.

4. Slitted coil: the rolled coil can be sliced into several individual coils after the slitting process. The maximum thickness is 12.7mm for the slitted coils.

In sheet:

the rolled coil will be skin-passed, leveled and cut into sheets. Due to the careful inspection and removal of the defect, the final product will have a good shape and surface quality. The edge condition of the sheets could be mill edge or cut edge.

There are 2 package ways for the sheets. One is normal package, the sheets will be fastened by steel tapes without wrapping. The other is box package. The sheets will be wrapped in oilpaper and protected by boards from the sides and top direction. Stow-wood and tray will be fastened under the sheets. In order to avoid the rust and scratch during transport and storage, it's better to choose the box package.

The in sheet delivery condition is not available for Stainless steel business unit and Meishan for they do not have cutting edge line.

热轧产品的重量：

卷状交货

对于钢卷，重量按照实际重量计算。单个钢卷由于各个机组的生产状况不同，其可供重量范围也不同。一般随着订货宽度的增加，直发卷的可供重量也会增加，有如下经验公式：

宽度单位：米

生产单元	直发卷可供重量（吨）	
	最小	最大
总部	15.5×宽度	23×宽度
不锈钢	12.5×宽度	19.5×宽度
梅钢	13×宽度	16×宽度

平整卷或分卷交货时由于可以将钢卷切分成多个钢卷，因此最小卷重可以是5吨。

板状交货

对于钢板，4mm以下只能按照实际重量计重，4mm以上可以选择按实际重量交货或者按理论重量交货。

钢板理论重量计算公式一般如下：

钢板理论重量（吨）=宽度×长度×厚度×7.85×钢板张数

其中宽度、长度、厚度单位为米，重量单位为吨。更多信息可以参照GB/T 709–2006。

板状交货最大重量为10吨。

The nominal weight

In coil:

The nominal weight of the coils is as weighted. For the as-rolled coils, the weight range differs according to the lines. The available weight increases when the width increases. The available weight is listed as following:

Width: meter

Line	As rolled coil weight (ton)	
	Minimum	Maximum
Baosteel Core Base	15.5×width	23×width
Baosteel Stainless Steel Business Unit	12.5×width	19.5×width
Baosteel Meishan	13×width	16×width

The minimum weight of the cut-coil or skin-passed coils is 5 ton as the coils could be cut into several small coils.

In sheets:

For thickness below 4mm, the weight of the sheet could be as weighted .For thickness above 4mm, the weight of the sheets could be as weighted or as theory.

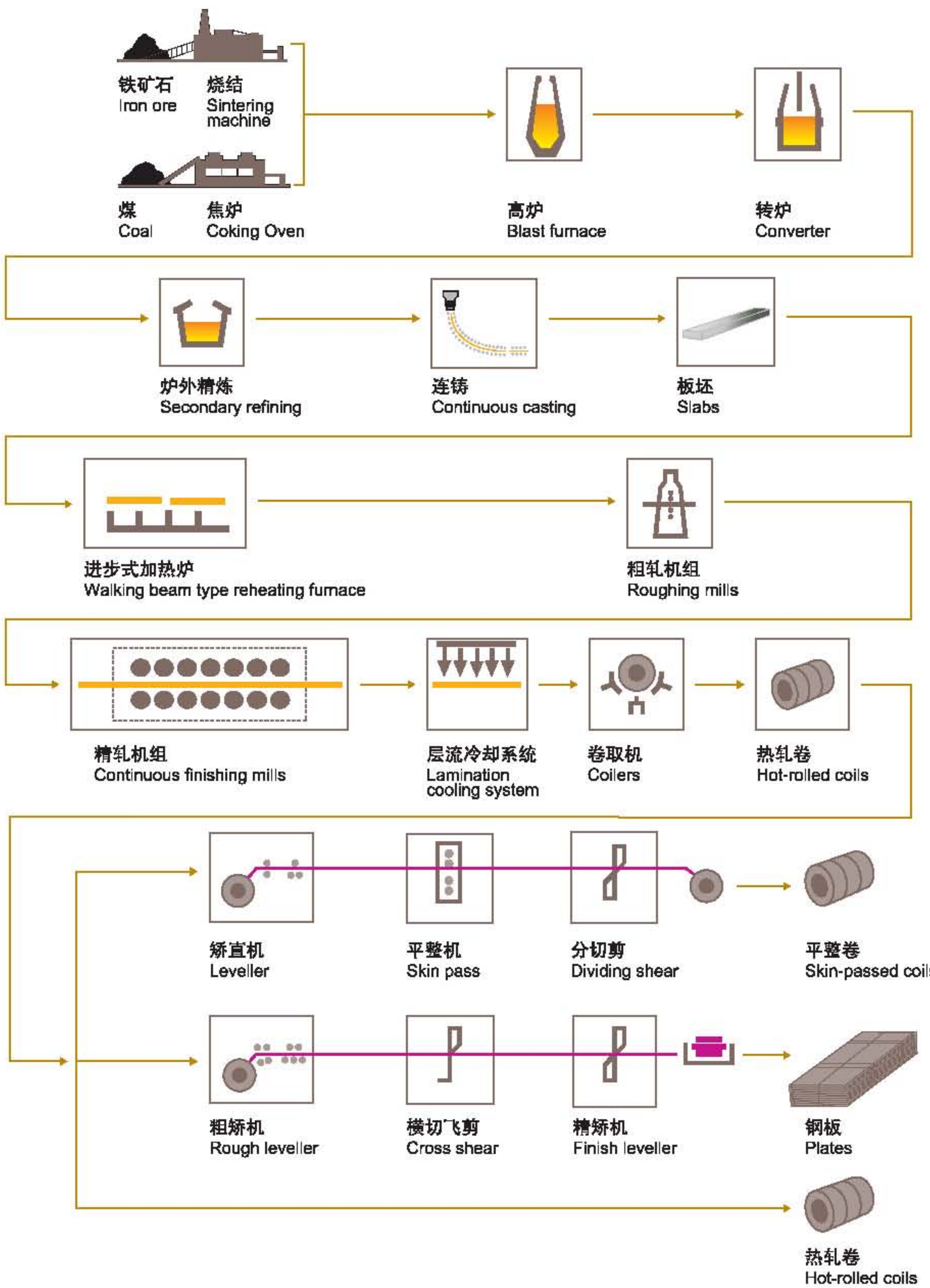
The theory weight is calculated as the following formula:

Theory weight(ton)=width×length×thickness×7.85×number of sheets

The unit of width, length and thickness is meter. For more information, please refer to GB/T 709-2006.

The maximum weight of a steel sheets package is 10 ton.

热轧生产流程图
Prodcution flow chart of hot-rolled steel



产品介绍
Product Introduction

- 冷成型用热连轧钢板及钢带/Hot-rolled cold forming steel
- 结构用热连轧钢板及钢带/Hot-rolled structural steel
- 汽车结构用热连轧钢板及钢带/Hot-rolled automobile structural steel
- 冷成型用高屈服强度热连轧钢板及钢带/Hot-rolled high strength cold forming steel
- 冷成型用先进高强度热连轧钢板及钢带/Hot-rolled advanced high strength cold forming steel
- 建筑结构用热连轧钢板及钢带/Hot-rolled building structural steel
- 船体结构用热连轧钢板和钢带/Hot-rolled hull structural steel
- 耐腐蚀结构用热连轧钢板及钢带/Hot-rolled anti-corrosion structural steel
- 表面硬化钢热连轧钢板及钢带/Hot-rolled case-hardening steel
- 直缝焊套管用热连轧钢带/Hot-rolled steel for straight welded casing and tube
- 热连轧花纹钢板及钢带/Hot-rolled checker steel
- 搪瓷用高强度热连轧钢板和钢带/Hot-rolled high strength enameling steel
- 刀模和锯片用热连轧钢板及钢带/Hot-rolled die-cutting and sawblade steel

冷成型用热连轧钢板及钢带
Hot-rolled cold forming steel

冷成型用热连轧钢按照其用途可以分为一般用、冲压用、深冲用和超深冲用。宝钢生产的冷成型用热连轧钢使用低碳成分，具有良好的冲压性能、焊接性能和较高的尺寸精度，被广泛应用在各个冷成型行业。

The hot-rolled forming steel could be classified into commercial quality (CQ), drawing quality (DQ), deep drawing quality (DDQ) and extra-deep drawing quality (EDDQ) by its intended application. With low carbon content, excellent drawing and welding performance, high dimension accuracy, Baosteel's hot-rolled forming steels are widely used in many drawing industries.



用途	特点	牌号
一般用	具有足够的延展性，适合于简单的成型、弯曲或焊接工艺	DD11、SPHC
冲压用	具有比一般用级别更大的延展性、适合于制造冲压成型及较复杂变形的零部件	DD12、SPHD
深冲用	具有比冲压级更大的延展性，适合于制造深冲压成型及复杂变形的零部件	DD13、SPHE
特深冲用	具有比深冲压级更大的延展性，适合制造特深冲压成型和更为复杂的零部件	DD14、SPHF、BRC1、BRC2、BRC3

Application	Feature	Steel grades
Commercial use	With some ductility, these steel are applied to simple forming, bending or welding.	DD11、SPHC
Drawing	With more ductility than commercial use steels, they are applied to manufacture parts through drawing and relatively complicated forming.	DD12、SPHD
Deep drawing	With more ductility than drawing steel, they are applied to manufacture parts through deep drawing and complicated forming.	DD13、SPHE
Extra-deep drawing	With more ductility than deep drawing steel, they are applied to manufacture parts through extra-deep drawing and more complicated forming.	DD14、SPHF、BRC1、BRC2、BRC3

供货标准、牌号与相当或相近牌号对照表
Reference list of steel grades and corresponding grades

标准号 Standard No.	Q/BQB 302-2009	DIN1614-2-86	EN111-77	EN10111- 2008(E)	JIS G 3131-2005	GB/T 710-2008 GB/T 711-2008
牌号 Grades	DD11 SPHC	StW22	FeP11	DD11	SPHC	08
	DD12 SPHD	RRStW23	FeP12	DD12	SPHD	08
	DD13 SPHE	StW24	FeP13	DD13	SPHE	08
	DD14 SPHF	-	-	DD14	SPHF	-
	BRC1、BRC2、 BRC3	-	-	DD14	SPHF	-

化学成分
Chemical composition

牌号 Grades	化学成分（熔炼分析）% Chemical composition (ladle analysis)					
	C	Si	Mn	P	S	Alt
DD11	≤0.12	≤0.05	≤0.60	≤0.035	≤0.035	≥0.010
SPHC	≤0.15	≤0.05	≤0.60	≤0.035	≤0.035	≥0.010
DD12	≤0.10	≤0.07	≤0.45	≤0.035	≤0.035	≥0.010
SPHD	≤0.10	≤0.05	≤0.50	≤0.035	≤0.035	≥0.010
DD13	≤0.08	≤0.07	≤0.40	≤0.030	≤0.030	≥0.010
DD14	≤0.08	≤0.07	≤0.35	≤0.025	≤0.025	≥0.010
SPHE	≤0.10	≤0.05	≤0.50	≤0.030	≤0.035	≥0.010
SPHF	≤0.08	≤0.05	≤0.50	≤0.025	≤0.025	≥0.010
BRC1	≤0.08	≤0.05	≤0.40	≤0.030	≤0.025	≥0.010
BRC2	≤0.05	≤0.05	≤0.40	≤0.025	≤0.020	≥0.010
BRC3	≤0.03	≤0.05	≤0.30	≤0.025	≤0.020	≥0.010

备　注：由供方选择，可添加特殊元素。
如需方后续进行镀锌，请通知我们以便采用低硅工艺，保证镀锌质量

Remark: Other elements may be added on the manufacturer's option.
If the steel be galvanized later, please inform us to implement a low silicon process to improve the galvanize quality.

力学性能
Mechanical properties

牌号 Grades	拉伸试验（横向） Tensile test (transverse)							性能保证期(月) Guaranteed time of property (Month)
	下列公称厚度(mm)时的屈服强度 Yield strength according to thickness MPa		抗拉强度 Tensile strength MPa	下列公称厚度(mm)时的伸长率 % Elongation for thickness:				
				L_0=80mm，b=20mm			$L_0=5.65\sqrt{S_0}$	
	<2.0	2.0~11.0		<1.5	1.5~<2.0	2.0~<3.0	3.0~11.0	
DD11	170~360	170~340	≤440	≥22	≥23	≥24	≥28	3
DD12	170~340	170~320	≤420	≥24	≥25	≥26	≥30	6
DD13	170~330	170~310	≤400	≥27	≥28	≥29	≥33	6
DD14	170~310	170~290	≤380	≥30	≥31	≥32	≥36	6

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)							180° 弯曲试验 弯心直径 180° Bend test Inner diameter		性能保证期(月) Guaranteed time of property (Month)
	抗拉强度 Tensile strength MPa	下列公称厚度(mm)时的伸长率 % Elongation for thickness: L_0=50mm,b=25mm								
		<1.6	1.6~<2.0	2.0~<2.5	2.5~<3.2	3.2~<4.0	≥4.0	<3.2	≥3.2	
SPHC	≥270	≥27	≥29	≥29	≥29	≥31	≥31	0a	1a	3
SPHD	≥270	≥30	≥32	≥33	≥35	≥37	≥39	-	-	6
SPHE	≥270	≥31	≥33	≥35	≥37	≥39	≥41	-	-	6
SPHF	≥270	≥37	≥38	≥39	≥39	≥40	≥42	-	-	6

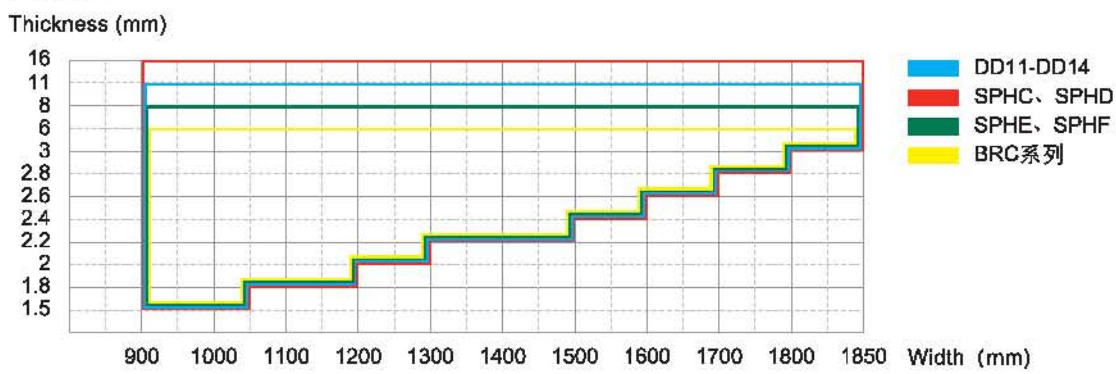
牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)							性能保证期(月) Guaranteed time of property (Month)
	抗拉强度 Tensile strength MPa	下列公称厚度 (mm) 时的伸长率 % Elongation for thickness: L=50mm, b=25mm						
		1.5~<1.6	1.6~<2.0	2.0~<2.5	2.5~<3.2	3.2~<4.0	4.0~6.0	
BRC1	≥275	≥33	≥35	≥37	≥39	≥41	≥42	6
BRC2	≥255	-	≥37	≥39	≥41	≥43	≥44	6
BRC3	≥255	-	≥39	≥41	≥43	≥45	≥46	6

由于冷成型用钢存在时效现象，建议尽早使用。

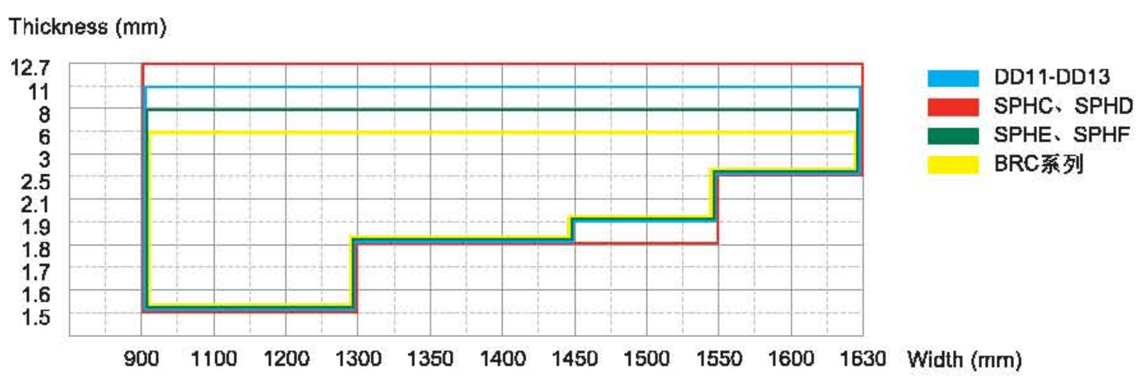
Because of the aging effect, cold forming steel is recommended to use early.

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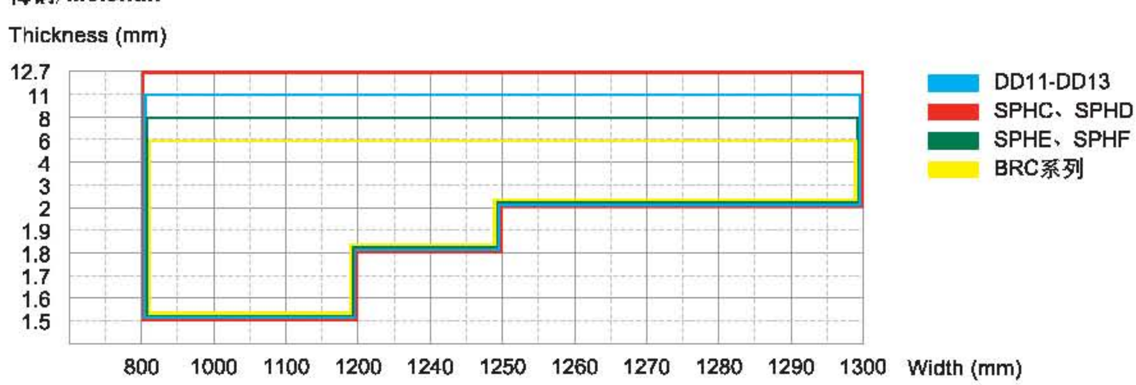
宝钢总部/Core Base



不锈钢事业部/Stainless Steel Business Unit



梅钢/Meishan



结构用热连轧钢板及钢带
Hot-rolled structural steel



结构用钢一般具有较高的强度与较好的成型性能，通常经过简单的加工后承受外部的载荷。宝钢的结构钢产品具有性能可靠，成形能力好，焊接性能优的特点，其产品主要参照日标与欧标进行供货，被广泛应用在各个行业。

按照其用途，可以将结构钢分为普通结构钢、焊接结构钢，机械结构钢、钢管用钢等几类。

General structure steel has high strength and good formablilty. It can afford heavy load after common machining. The structure steel of Baosteel has reliable mechanical property, good formability and excellent welding performance, which is widely used in various industries.

Structure steel can be classified as normal structure steel, welding structure steel, tool steel and pipe steel.

一、普通结构用钢
Structural steel

用于建筑、桥梁、船舶、车辆等结构件。

For the structure part in building, bridge, ship and automobile.

类别 Classification	牌号 Grades	公称厚度 Nominal thickness mm
结构用 Structural steel	SS330	≤12.7
	SS400	≤22.0
	SS490	≤16.0
	SS540	≤6.0
	S185(St33)	≤18.0
	S235JR(St37-2) S235J0(St37-3) S235J2 S275JR(St44-2) S275J0、S275J2、S355JR S355J0(St52-3) S355J2、S355K2	≤25.4
	E295(St50-2)	≤10.0

供货标准、牌号与相当或相近牌号对照表
Reference list of steel grades and corresponding grades

Q/BQB 303-2009	JIS G3101:2004	GB 912-89/GB 3274-88 GB 710-91/GB 711-88
SS330	SS330	Q195, Q215A, 15
SS400	SS400	Q235A, Q255A
SS490	SS490	Q275A
SS540	SS540	-

Q/BQB 303-2009	DIN17100-80	EN10025:1990	EN10025-2:2004	GB 912-2008/GB 3274-2007
S185(St33)	St33	Fe310-0	S185	Q195, Q215A
S235JR(St37-2)	St37-2, RSt37-2	Fe360B	S235JR	Q235B
S235J0(St37-3)	St37-3	Fe360C	S235J0	Q235C
S235J2	-	Fe360D	S235J2	Q235D
S275JR(St44-2)	St44-2	Fe430B	S275JR	Q255B
S275J0	St44-3	Fe430C	S275J0	Q255C
S275J2	-	Fe430D	S275J2	Q255D
E295(St50-2)	St50-2	Fe490-2	E295	Q345A
S355JR	-	Fe510B	S355JR	Q345B
S355J0(St52-3)	St52-3	Fe510C	S355J0	Q345C
S355J2	-	Fe510D	S355J2	Q345D
S355K2	-	Fe510DD	S355K2	Q345E

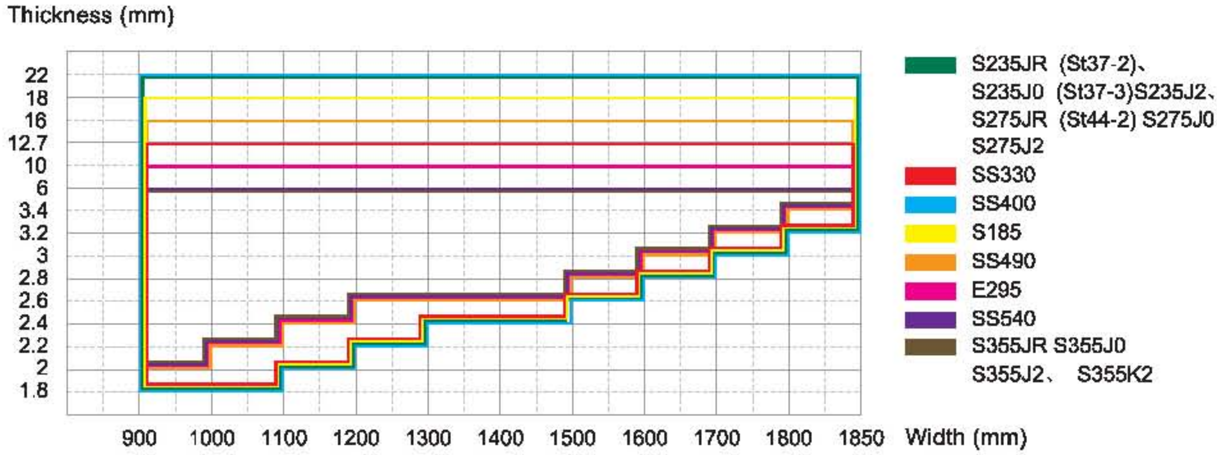
力学性能
Mechanical properties

牌号 Grades	拉伸试验（横向）/ Tensile test (transverse)						180° 弯曲试验 b≥35mm 弯心直径 / 180° Bend test b≥35mm Inner diameter
	上屈服强度 Upper yield strength MPa		抗拉强度 Tensile strength MPa	伸长率 Elongation %			
				L_0=50mm b=25mm	L_0=200mm b=40mm		
	公称厚度 Nominal thickness mm			公称厚度 Nominal thickness mm			
	≤16	>16		≤5	>5～16	>16	
SS330	≥205	≥195	330～430	≥26	≥21	≥26	1a
SS400	≥245	≥235	400～510	≥21	≥17	≥21	3a
SS490	≥285	≥275	490～610	≥19	≥15	≥19	4a
SS540	≥400	≥390	≥540	≥16	≥13	≥17	4a

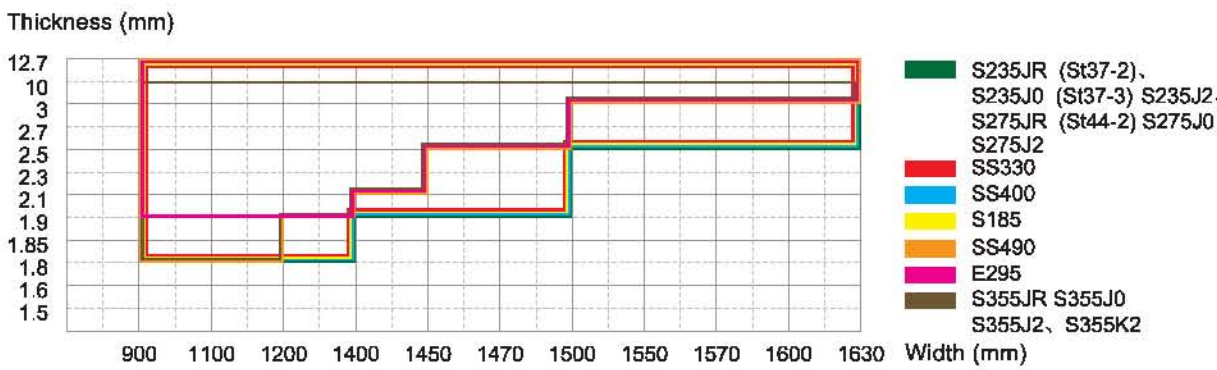
牌号 Grades	拉伸试验（横向） Tensile test (transverse)								180° 弯曲试验 弯心直径 180° Bend test Inner diameter		V型冲击试验 V-notch impact test	
	上屈服强度 Upper yield strength MPa		抗拉强度 Tensile strength MPa		伸长率 Elongation %							
					L_0=80mm,b=20mm			$L_0=5.65\sqrt{S_0}$				
	公称厚度 Nominal thickness mm		公称厚度 Nominal thickness mm		公称厚度 Nominal thickness mm				公称厚度 Nominal thickness mm		试验温度 Temperature ℃	冲击功 Energy J
	≤16.0	>16.0	<3.0	≥3.0	1.5~2.0	2.0~2.5	2.5~<3.0	≥3.0	<3.0	≥3.0		
S185(St33)	≥185	≥175	310~540	290~510	≥10	≥11	≥12	≥16	3a	3.5a	-	-
S235JR(St37-2)d	≥235	≥225	360~510	360~510	≥17	≥18	≥19	≥24	1.5a	2a	20	≥27
S235J0(St37-3)	≥235	≥225	360~510	360~510	≥17	≥18	≥19	≥24	1.5a	2a	0	≥27
S235J2	≥235	≥225	360~510	360~510	≥17	≥18	≥19	≥24	1a	1.5a	-20	≥27
S275JR(St44-2)	≥275	≥265	430~580	410~560	≥15	≥16	≥17	≥21	2.5a	3a	20	≥27
S275J0	≥275	≥265	430~580	410~560	≥15	≥16	≥17	≥21	2.5a	3a	0	≥27
S275J2	≥275	≥265	430~580	410~560	≥15	≥16	≥17	≥21	2.5a	3a	-20	≥27
E295(St50-2)	≥295	≥285	490~660	470~610	≥12	≥13	≥14	≥18	-	-	-	-
S355JR	≥355	≥345	510~680	470~630	≥14	≥15	≥16	≥20	2.5a	3a	20	≥27
S355J0(St52-3)	≥355	≥345	510~680	470~630	≥14	≥15	≥16	≥20	2.5a	3a	0	≥27
S355J2	≥355	≥345	510~680	470~630	≥14	≥15	≥16	≥20	2.5a	3a	-20	≥27
S355K2	≥355	≥345	510~680	470~630	≥14	≥15	≥16	≥20	2.5a	3a	-20	≥40

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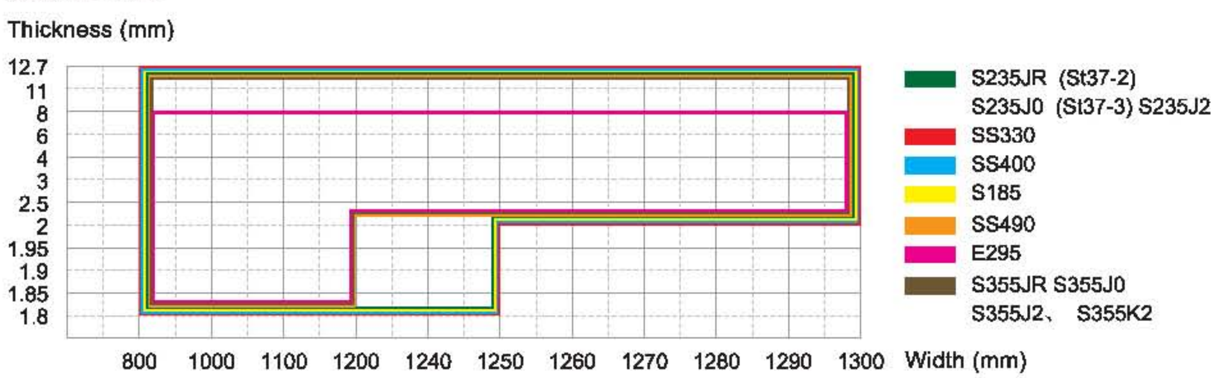
宝钢总部/Core Base



不锈钢事业部/Stainless Steel Business Unit



梅钢/Meishan



二、焊接结构用钢
Welding structural steel

用于建筑、桥梁、船舶、车辆、 石油储罐、工程机械等要求优良的综合力学性能及焊接性能的结构件。

For the structure part with high requirement of mechanical property and welding performance in building, bridge, ship, automobile, pertroleum container and construction vehicles.



类别 Classification	牌号 Grades	公称厚度 Nominal thickness mm
焊接结构用 Welding structural steel	SM400A、SM400B SM490A SM570	≤16.0
	SM400C SM490B、SM490C SM490YA、 SM490YB SM520B、SM520C	≤12.7
	BSM590	≤16.0
	StE255、StE285	<10.0
	StE355	<16.0

供货标准、牌号与相当或相近牌号对照表
Reference list of steel grades and corresponding grades

Q/BQB 303-2009	JIS G3106:2004	GB912-2008/GB3274-2007
SM400A	SM400A	Q235A, Q235B
SM400B	SM400B	Q235C
SM400C	SM400C	Q235D
SM490A	SM490A	Q345A, Q345B
SM490B	SM490B	Q345C
SM490C	SM490C	Q345D
SM490YA	SM490YA	Q390B
SM490YB	SM490YB	Q390C
SM520B	SM520B	Q420A, Q420B
SM520C	SM520C	Q420C
SM570 BSM590	SM570	Q460C, Q460D
B590GJA,B590GJB	-	Q460C, Q460D

Q/BQB 303-2009	DIN17102-80	EU113-72	EN10113-2:1993	EN10025-3:2004	GB 912-2008 GB 3274-2007
StE255	StE255	FeE255KGN	-	-	Q235C、Q235D
StE285	TStE285	FeE275KTN	S275N	S275N	Q275C、Q275D
StE355	StE355	FeE355KGN	S355N	S355N	Q345c、Q345D

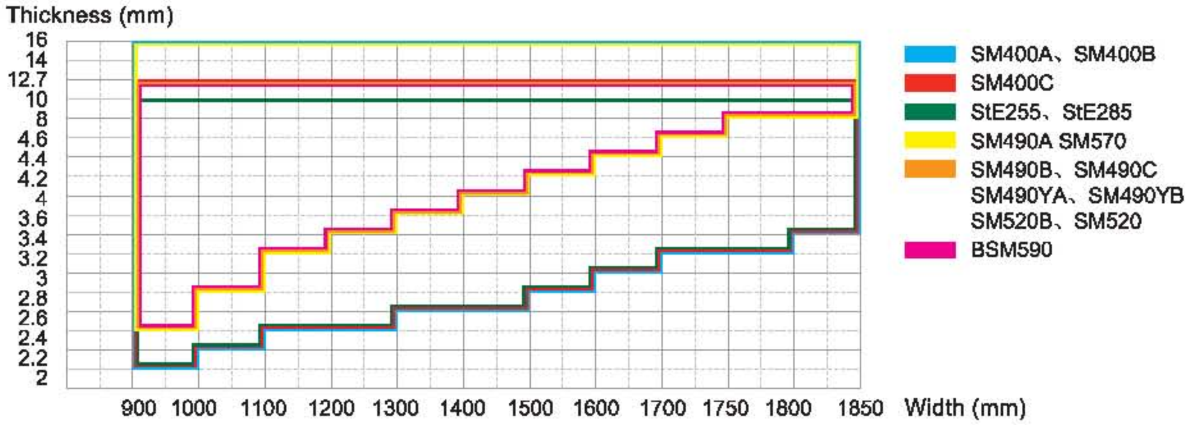
力学性能
Mechanical properties

牌号 Grades	拉伸试验（横向） Tensile test (transverse)						180° 弯曲试验 b≥35mm 弯心直径 180° Bend test b≥35mm Inner diameter	V型冲击试验 V-notch impact test	
	上屈服强度 Upper yield strength MPa 公称厚度 Nominal thickness mm		抗拉强度 Tensile strength MPa	伸长率 Elongation %				温度 Temperature ℃	冲击功 Energy J
				L_0=50mm b=25mm	L_0=200mm b=40mm 公称厚度 Nominal thickness mm				
	≤16	>16		≤5	>5～16	>16			
SM400A	≥245	≥235	400～510	≥23	≥18	≥22	2a	-	-
SM400B	≥245	≥235	400～510	≥23	≥18	≥22	2a	0	≥27
SM400C	≥245	≥235	400～510	≥23	≥18	≥22	2a	0	≥47
SM490A	≥325	≥315	490～610	≥22	≥17	≥21	3a	-	-
SM490B	≥325	≥315	490～610	≥22	≥17	≥21	3a	0	≥27
SM490C	≥325	≥315	490～610	≥22	≥17	≥21	3a	0	≥47
SM490YA	≥365	≥355	490～610	≥19	≥15	≥19	3a	-	-
SM490YB	≥365	≥355	490～610	≥19	≥15	≥19	3a	0	≥27
SM520B	≥365	≥355	520～640	≥19	≥15	≥19	3a	0	≥27
SM520C	≥365	≥355	520～640	≥19	≥15	≥19	3a	0	≥47
SM570	≥460	-	570～720	≥19	≥19	-	3a	-5	≥47
BSM590	≥450	-	590～710	≥20	≥20	-	2a	-5	≥47

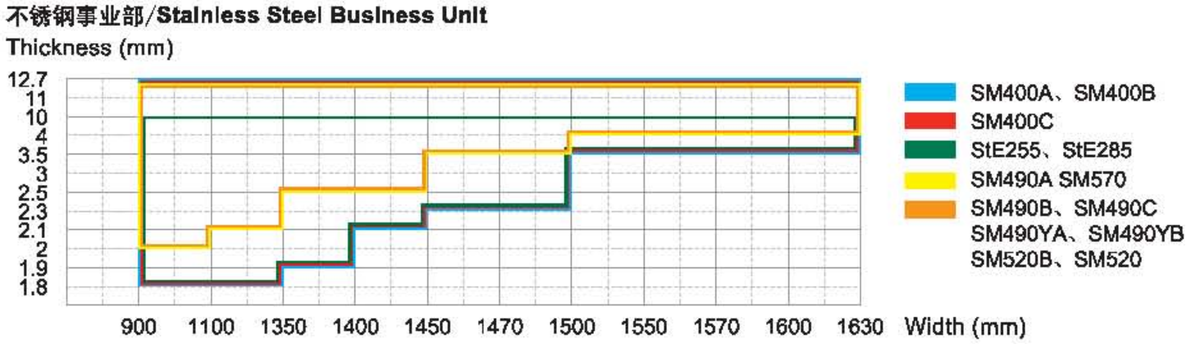
牌号 Grades	拉伸试验（横向） Tensile test (transverse)			180° 弯曲试验 弯心直径 180° Bend test Inner diameter	V型冲击试验 V-notch impact test	
	屈服强度 Yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation $L_0=5.65\sqrt{S_0}$ %		试验温度 Temperature ℃	冲击功 Energy J
StE255	≥255	360～480	≥25	1a	20 0 -10 -20	≥31 ≥31 ≥24 ≥21
StE285	≥285	390～510	≥24	2a		
StE355	≥355	490～630	≥22	3a		

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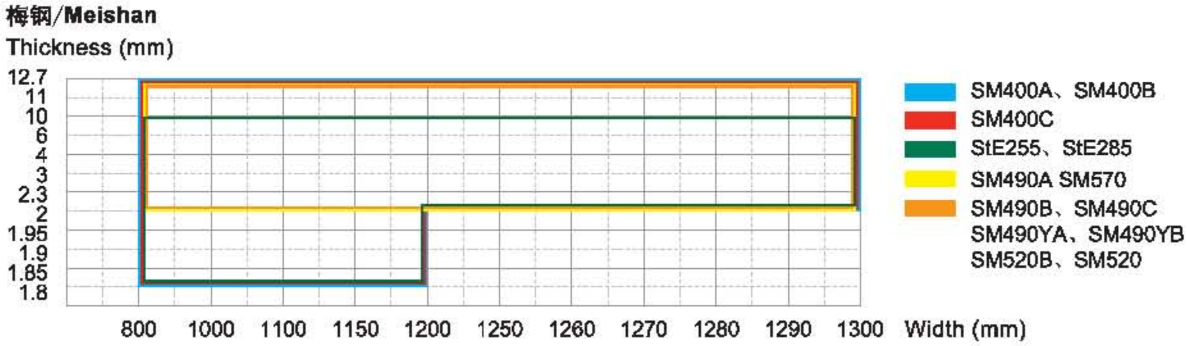
宝钢总部/Core Base



不锈钢事业部/Stainless Steel Business Unit



梅钢/Meishan



三、机械结构用钢
Machinery structural steel

机械结构用钢一般在切削、成形之后通过热处理工艺获得希望的性能。通常它被用来加工高强度的机械结构件。宝钢生产的机械结构用钢，钢质纯净，偏析与夹杂物控制好，受到行业的欢迎。

After cutting and forming, the machinery structure steel goes through heat treatment process to achieve the required mechanical properties. The steel is used to make high strength machine parts.
Baosteel has produced the machinery structure steel with pure composition, good control of segregation and inclusion. The product is welcomed in the industry.



类别 Classification	牌号 Grades	公称厚度 Nominal thickness mm
机械结构用 Machinery structural steel	C22、C35	<5.0
	S20C、S35C、S45C	≤8.0

化学成份
Chemical composition

牌号 Grades	化学成分（熔炼分析）% Chemical composition (ladle analysis)				
	C	Si	Mn	P	S
C22	0.17~0.24	≤0.40	0.40~0.70	≤0.035	≤0.035
C35	0.32~0.39	≤0.40	0.50~0.80	≤0.035	≤0.035
S20C	0.18~0.23	0.15~0.35	0.30~0.60	≤0.030	≤0.030
S35C	0.32~0.38	0.15~0.35	0.60~0.90	≤0.030	≤0.030
S45C	0.42~0.48	0.15~0.35	0.60~0.90	≤0.030	≤0.030

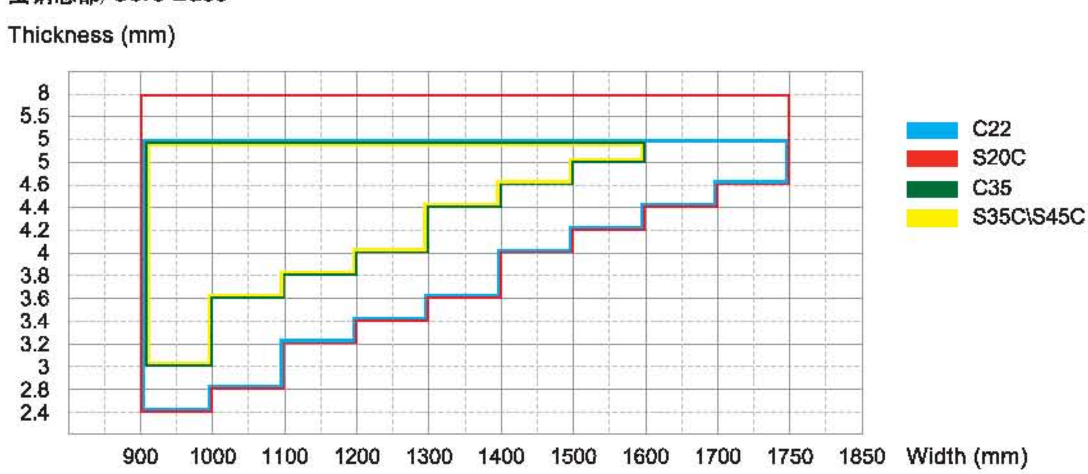
推荐热处理工艺和性能
Recommended heat treatment and properties

牌号 Grades	热处理方式 Heat treatment		
	正火 Normalizing ℃	调质 Quenching and tempering ℃	
		淬火 Quenching	回火 Tempering
C22	880~920	860~900,水冷 Water cooling	550~660
C35	860~900	840~880,水冷或油冷 Water cooling or oil cooling	550~660

牌号 Grades	热处理 Heatment	拉伸试验 Tensile test			
		上屈服强度 Upper yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation $L_0=5.65\sqrt{S_0}$ %	断面收缩率 Area reduction %
C22	N	≥240	≥430	≥24	-
	QT	≥340	500~650	≥20	≥50
C35	N	≥300	≥550	≥18	-
	QT	≥430	630~780	≥17	≥40

可供范围
Available size

宝钢总部/Core Base



四、焊管用钢
Hot-rolled steel for pipes and tubes

SPHT系列焊管用钢是宝钢按照日本标准JIS G3132生产的产品，用于制造不同口径的焊管。宝钢生产的该产品具有延伸率高、折弯性能好等优点，受到用户的好评。

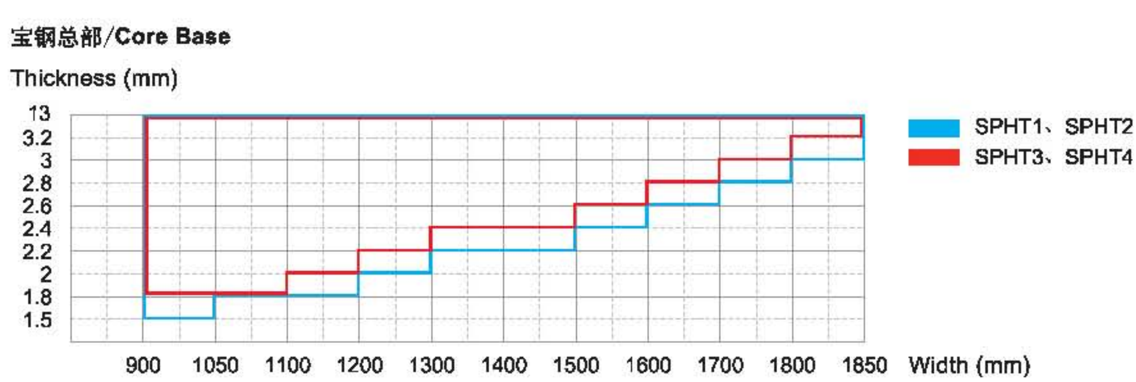
Baosteel manufactures SPHT series steel according to JIS G3132. The product is suitable to make pipes or tubes of different diameter. With high elongation and bending performance, it is welcomed by the users.



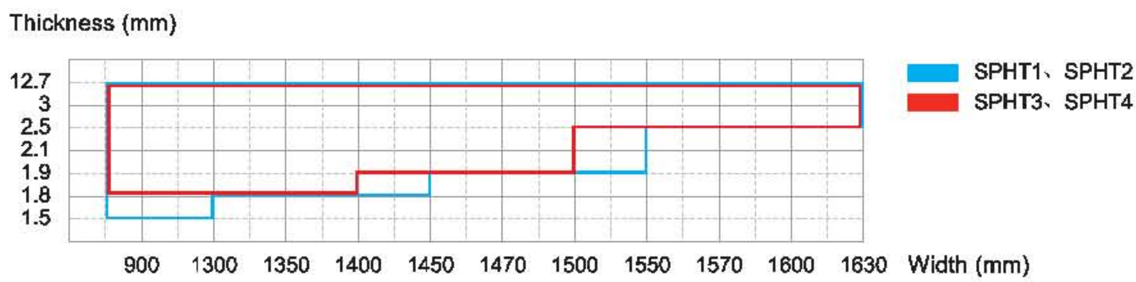
力学性能
Mechanical properties

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)					180° 弯曲试验 弯心直径 180° Bend test Inner diameter	
	抗拉强度 Tensile strength MPa	伸长率 Elongation %					
		公称厚度 Nominal thickness mm				公称厚度 Nominal thickness mm	
		<1.6	1.6~<3.0	3.0~<6.0	6.0~≤13.0	≤3.0	>3.0
SPHT1	≥270	≥30	≥32	≥35	≥37	0a	1a
SPHT2	≥340	≥25	≥27	≥30	≥32	2a	3a
SPHT3	≥410	≥20	≥22	≥25	≥27	3a	4a
SPHT4	≥490	≥15	≥18	≥20	≥22	3a	4a

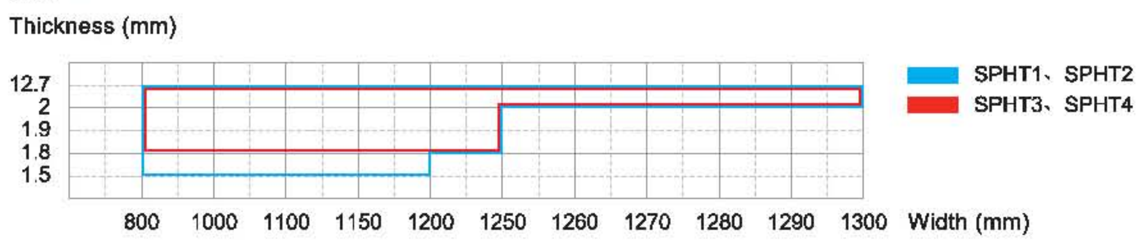
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不锈钢事业部/Stainless Steel Business Unit



梅钢/Meishan



五、热轧高耐磨钢
Hot-rolled wearing steel

热轧高耐磨钢是宝钢专门为水泥运输车、矿山机械等开发的钢材。该系列产品的成型性能较好，可以方便地进行冷折弯。较低的碳当量可以保证焊接的质量。同时高强度与硬度可以经受长时间的磨损。
因其优秀的综合性能，该产品在行业内被广泛使用。

Hot-rolled wearing steels are specially developed for cement carriers and mining machines. This series of products is suitable for cold forming, such as bending. Low carbon equivalence ensures the quality after welding process. With high strength and hardness, the products can guarantee a long work life against wearing.
Due to the excellent comprehensive properties, the products are widely used.



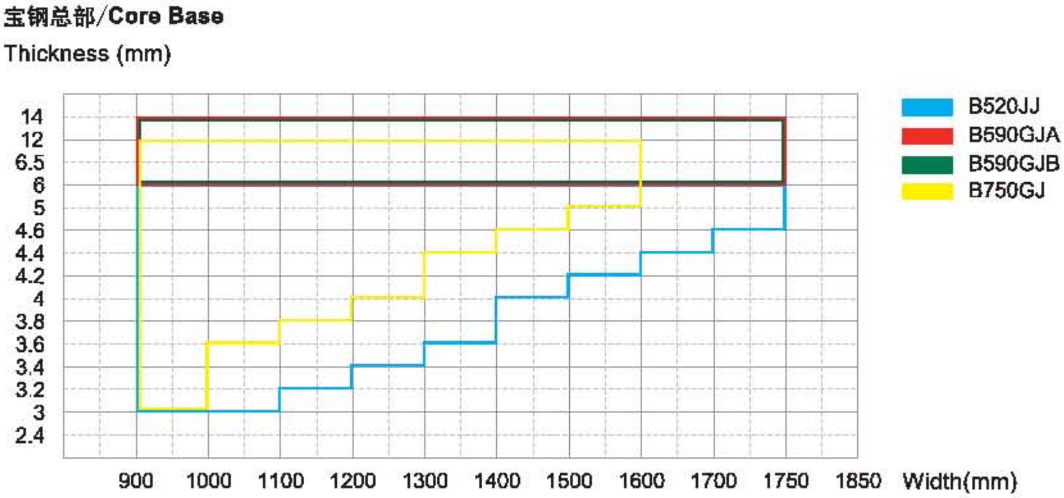
分类 Classification	牌号 Grades	公称厚度 Nominal thickness mm
耐磨钢 Wearing steel	B520JJ B590GJA B590GJB B750GJ	6.0~14.0

牌号 Grades	拉伸试验（横向） Tensile test (transverse)			180° 弯曲试验 弯心直径 180° Bend test Inner diameter	V型冲击试验 V-notch impact test	
	屈服强度 Yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation $L_0=5.65\sqrt{S_0}$ %		试验温度 Temperature ℃	冲击功 Energy J
B520JJ	≥365	≥520	≥20	2a	-	-
B590GJA	≥450	590~710	≥20	2a	0	≥47
B590GJB	≥450	590~710	≥20	2a	-10	≥47

牌号 Grades	公称厚度 Nominal thickness mm	拉伸试验 Tensile test			硬度 Hardness HV10
		屈服强度 Yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation $L_0=5.65\sqrt{S_0}$ %	
B750GJ	3.0~<6.0	≥620	≥750	≥14	230~300
	6.0~12.0	≥600	≥725	≥16	220~300

可供范围
Available size

宝钢总部/Core Base



汽车结构用热连轧钢板及钢带
Hot-rolled automobile structural steel

宝钢的汽车结构用热连轧钢具有较高的强度、良好的成型能力和焊接能力、较高的尺寸精度和表面质量，在各汽车及零部件厂家得到广泛应用，生产各类汽车结构部件，如车梁、车轮等。

The hot-rolled automobile structural steels of Baosteel are featured with high strength, excellent forming and welding performance and high dimension accuracy and surface quality. They are widely used in many automobile manufacturers to make automobile structure parts, such as vehicle beams and wheels.







用途	特点	牌号
汽车结构用钢 （牌号命名参照日标）	用于要求成型加工性能的汽车构架、 车轮等汽车结构件	SAPH310、SAPH370、 SAPH400、SAPH440
汽车高强结构用钢 （牌号命名参照日标）	用于要求良好成型加工性能并有 高强度要求的汽车构架、车轮等汽车结构件	SPFH540、SPFH590
汽车高强结构用钢 （牌号命名参照德标）	用于要求良好的冷成型性能并有较高或 高强度要求的汽车大梁等结构件	QStE340TM、QStE380TM、 QStE420TM、QStE460TM、QStE500TM
车轮用钢	具有良好的冷成型性能， 用于制造汽车 滚型车轮轮辋及轮辐	B330CL、B380CL、B420CL
车梁用钢	较好的强度和成型能力， 供制造汽车大梁、横梁用	B320L、B420L、B510L、 B510DL、B550L
传动轴用钢	供制造汽车传动轴管用	B440QZR、B480QZR
桥壳用钢	供制造汽车桥壳用	B440QK

Application	Feature	Grades
Automobile structure (named according to JIS)	Suitable for the automobile structure parts that require good formability, such as frame or wheels.	SAPH310、SAPH370、SAPH400、SAPH440
High strength automobile structure (named according to JIS)	Suitable for the automobile structure parts that require some formability and high strength, such as strong frame or wheels.	SPFH540、SPFH590
High strength automobile structure (named according to DIN)	Suitable for the structure parts that require high strength and good cold formability, such as truck beams.,	QStE340TM、QStE380TM、QStE420TM、QStE460TM、QStE500TM
Wheel steel	With good cold forming properties, suitable for wheel rims and disks.	B330CL、B380CL、B420CL
Beam steel	Suitable for vehicle beams and cross members.	B320L、B420L、B510L、B510DL、B550L
Drive shaft steel	Suitable for the automobile drive shafts.	B440QZR、B480QZR
Axle housings steel	Suitable for the automobile axle housings	B440QK

供货标准、牌号与相当或相近牌号对照表
Reference list of steel grades and corresponding grades

Q/BQB310-2009	YB/T 4151-2006
B330CL	330CL
B380CL	380CL
B420CL	-

Q/BQB310-2009	GB/T 3273-2005
B320L	-
B420L	420L
B510L	510L
B510DL	-
B550L	550L

Q/BQB310-2009	JIS G3113-2006
SAPH310	SAPH310
SAPH370	SAPH370
SAPH400	SAPH400
SAPH440、B440QK	SAPH440



Q/BQB310-2009	JIS G3134-2006
SPFH540	SPFH540
SPFH590	SPFH590

Q/BQB310-2009	SEW092:95	EN10149-2:1995	ISO6930-1:2001	SAEJ1392:2001	GB/T20887.1-2007
QStE340TM	QStE360TM	S355MC	FeE355	050XLK	HR355F
QStE380TM	QStE380TM	-	-	-	HR380F
QStE420TM	QStE420TM	S420MC	FeE420	060XLK	HR420F
QStE460TM	QStE460TM	S460MC	FeE460	-	HR460F
QStE500TM	QStE500TM	S500MC	FeE500	070XLK	HR500F

化学成份

Chemical composition

牌号 Grades	化学成分(熔炼分析)% Chemical composition (ladle analysis)						
	C	Si	Mn	P	S	Alt	其它 Others
QStE340TM	≤0.12	≤0.50	≤1.30	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15
QStE380TM	≤0.12	≤0.50	≤1.40	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15
QStE420TM	≤0.12	≤0.50	≤1.50	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15
QStE460TM	≤0.12	≤0.50	≤1.60	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15
QStE500TM	≤0.12	≤0.50	≤1.70	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15

牌号 Grades	化学成分(熔炼分析)% Chemical composition (ladle analysis)					
	C	Si	Mn	P	S	Alt
SAPH310	≤0.10	≤0.30	≤0.50	≤0.035	≤0.035	≥0.010
SAPH370	≤0.21	≤0.30	≤0.75	≤0.035	≤0.035	≥0.010
SAPH400	≤0.21	≤0.30	≤1.40	≤0.030	≤0.025	≥0.010
SAPH440	≤0.21	≤0.30	≤1.50	≤0.030	≤0.025	≥0.010
SPFH540	≤0.15	≤0.50	≤1.80	≤0.025	≤0.025	≥0.010
SPFH590	≤0.18	≤0.60	≤2.00	≤0.025	≤0.025	≥0.010
B440QK	≤0.21	≤0.35	≤1.80	≤0.030	≤0.025	≥0.010
B330CL	≤0.10	≤0.30	≤0.50	≤0.030	≤0.025	≥0.010
B380CL	≤0.12	≤0.30	≤1.20	≤0.030	≤0.025	≥0.010
B420CL	≤0.12	≤0.30	≤1.50	≤0.030	≤0.025	≥0.010
B320L	≤0.10	≤0.30	≤0.50	≤0.030	≤0.035	≥0.010
B420L	≤0.12	≤0.50	≤1.50	≤0.030	≤0.025	≥0.010
B510L	≤0.16	≤0.50	≤1.60	≤0.030	≤0.025	≥0.010
B510DL	≤0.18	≤0.30	≤1.60	≤0.025	≤0.020	≥0.010
B550L	≤0.16	≤0.50	≤1.60	≤0.030	≤0.025	≥0.010
B440QZR	≤0.12	≤0.50	≤1.30	≤0.030	≤0.025	-
B480QZR	≤0.16	≤0.50	≤1.50	≤0.030	≤0.035	-

为改善钢的性能，根据需要可添加其他合金元素，此时Alt的下限不要求。
The minimum aluminum content is not required if other alloy elements be added to improve the properties.

牌号 Grades	化学成分(熔炼分析)% Chemical composition (ladle analysis)						
	C	Si	Mn	P	S	Alt	其它 Others
QStE340TM	≤0.12	≤0.50	≤1.30	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15
QStE380TM	≤0.12	≤0.50	≤1.40	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15
QStE420TM	≤0.12	≤0.50	≤1.50	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15
QStE460TM	≤0.12	≤0.50	≤1.60	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15
QStE500TM	≤0.12	≤0.50	≤1.70	≤0.030	≤0.025	≥0.015	Nb≤0.09 V≤0.20 Ti≤0.15

力学性能
Mechanical properties

牌号 Grades	拉伸试验 (纵向) Tensile test (longitudinal)				180° 弯曲试验 弯心直径 180° Bend test Inner diameter
	上屈服强度 Upper yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation %		
			L_0=80mm,b=20mm	$L_0=5.65\sqrt{S_0}$	
			公称厚度 Nominal thickness mm		
			<3.0	≥3.0	
QStE340TM	≥340	420～540	≥19	≥25	0.5a
QStE380TM	≥380	450～590	≥18	≥23	
QStE420TM	≥420	480～620	≥16	≥21	
QStE460TM	≥460	520～670	≥14	≥19	1a
QStE500TM	≥500	550～700	≥12	≥17	

牌号 Grades	拉伸试验 (纵向) Tensile test (longitudinal)			180° 弯曲试验 弯心直径 180° Bend test Inner diameter
	下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 % Elongation L_0=50mm,b=25mm	
B440QK	≥295	≥440	≥34	1a

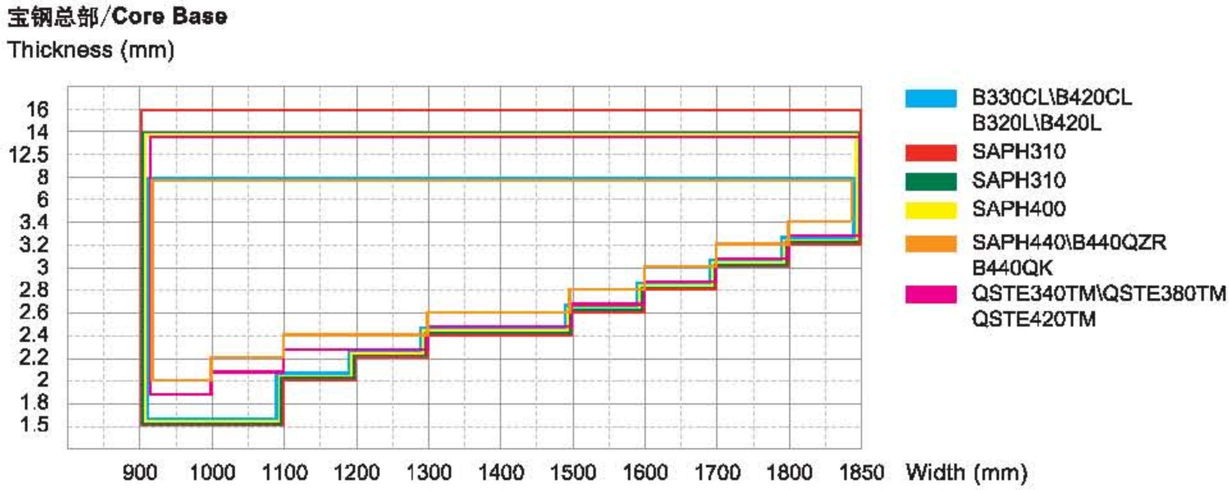
牌号 Grades	拉伸试验（横向） Tensile test(transverse)				180° 弯曲试验 弯心直径 180° Bend test Inner diameter
	下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa	屈强比 Yield ratio	伸长率 Elongation $L_0=5.65\sqrt{S_0}$ %	
B330CL	≥225	330~430	-	≥33	0a
B380CL	≥260,厚度(thickness)≤5.5mm	380~480	-	≥32	0.5a
	≥235,厚度(thickness) >5.5~10.0mm	380~480	-	≥28	0.5a
	≥220,厚度(thickness) >10.0~14.0mm	380~480	-	≥25	0.5a
B420CL	≥290	420~520	-	≥28	0.5a
B440QZR	≥320	440~570	-	≥15	1a
B480QZR	≥355	480~580	-	≥21	1a
B320L	≥215	320~420	-	≥27	0a
B420L	≥305	420~520	-	≥25	0.5a
B510L	≥355	510~630	-	≥24	0.5a
B510DL	≥355	510~630	≤0.80	≥24	1a
B550L	≥400	550~670	-	≥23	1a

牌号 Grades	拉伸试验（横向） Tensile test (transverse)						180° 弯曲试验 弯心直径 180° Bend test Inner diameter	
	上屈服强度 Upper yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 % Elongation L_0=50mm,b=25mm				公称厚度 Nominal thickness mm	
			公称厚度 Nominal thickness mm					
			1.6~<2.0	2.0~<2.5	2.5~<3.25	3.25~6.0	<3.25	≥3.25
SPFH540	≥355	≥540	≥21	≥22	≥23	≥24	2a	3a
SPFH590	≥420	≥590	≥19	≥20	≥21	≥22	3a	3a

牌号 Grades	抗拉强度 Tensile strength MPa	拉伸试验（纵向） Tensile strength (longitudinal) 上屈服强度 Upper yield strength MPa			伸长率 % Elongation L_0=50mm,b=25mm						180° 弯曲试验 弯心直径 180° Bend test Inner diameter	
		公称厚度 Nominal thickness mm										
		<6.0	6.0~<8.0	≥8.0	1.6~<2.0	2.0~<2.5	2.5~<3.15	3.15~<4.0	4.0~<6.3	≥6.3	<2.0	≥2.0
SAPH310d	≥310	≥185	≥185	≥175	≥33	≥34	≥36	≥38	≥40	≥41	0a	2a
SAPH370	≥370	≥225	≥225	≥215	≥32	≥33	≥35	≥36	≥37	≥38	1a	2a
SAPH400	≥400	≥255	≥235	≥235	≥31	≥32	≥34	≥35	≥36	≥37	2a	2a
SAPH440	≥440	≥305	≥295	≥275	≥29	≥30	≥32	≥33	≥34	≥35	2a	3a

可供范围
Available size

宝钢总部/Core Base



不锈钢事业部/Stainless Steel Business Unit



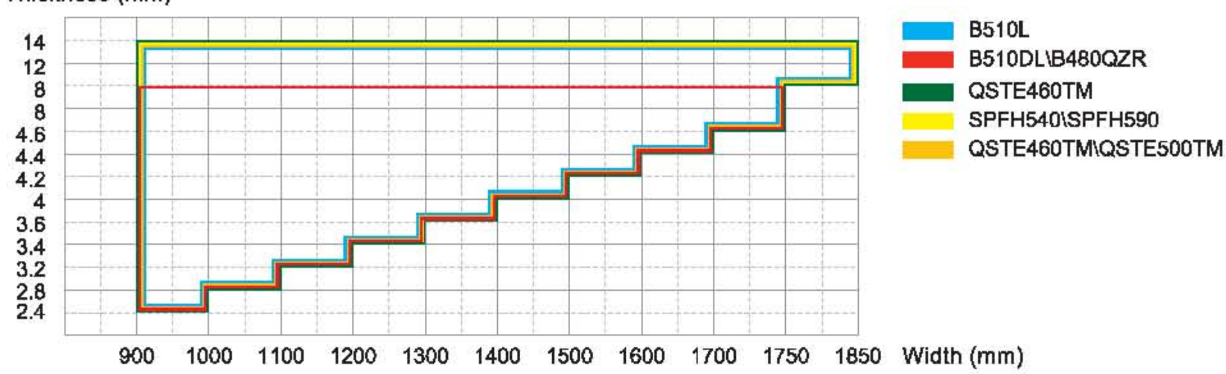
梅钢/Meishan

Thickness (mm)



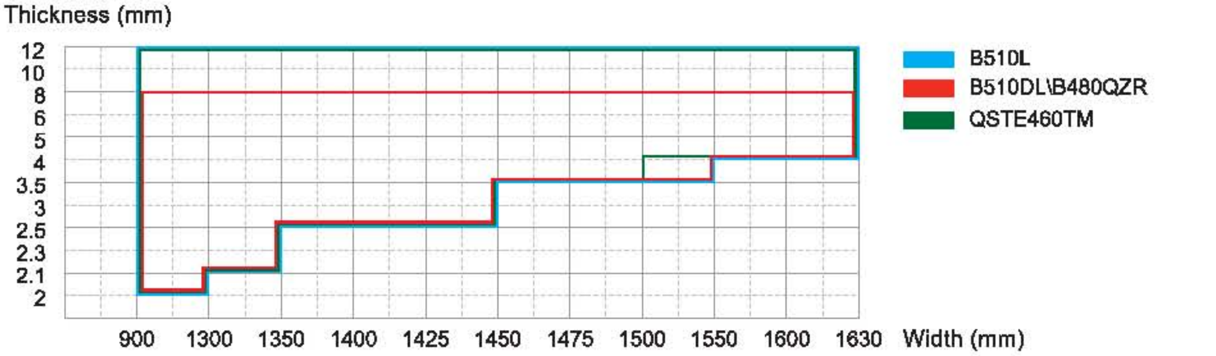
宝钢总部/Core Base

Thickness (mm)



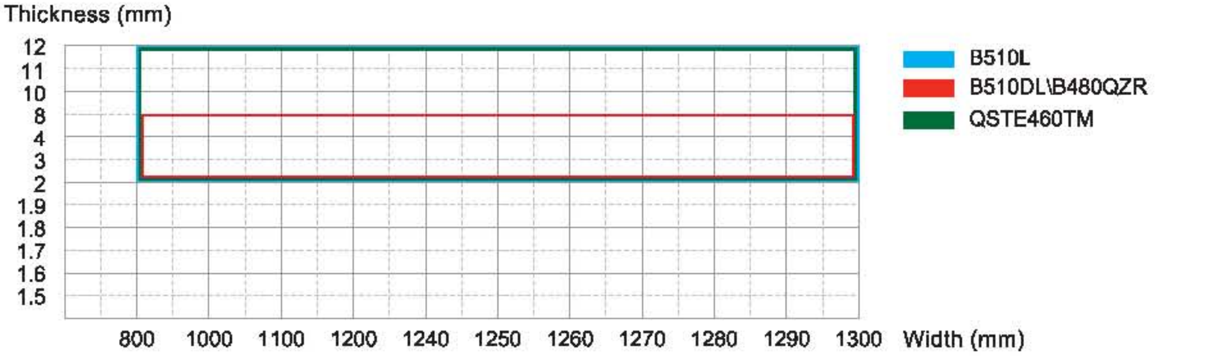
不锈钢事业部/Stainless Steel Business Unit

Thickness (mm)



梅钢/Meishan

Thickness (mm)



冷成形用高屈服强度热连轧钢板及钢带
Hot-rolled high strength cold forming steel

冷成形用高屈服强度热连轧钢根据其强度等级，可以用于制作汽车部件、保险箱、吊车吊臂等各个零件。
宝钢优秀的炼钢和轧制技术使冷成型高屈服强度钢具有均匀的组织、良好的折弯、焊接性能和优秀的表面质量。产品受到用户的欢迎，被广泛应用在工程机械行业。

According to different strength, high strength cold forming steels are used to make automobile parts, safety boxes or crane booms.
With excellent refining and rolling techniques, Baosteel makes these steels feature in refined structure, good bending and welding performance and pretty surface. The cold forming steel are widely used in many industries, such as construction machine industry.



Q/BQB 311-2009	BZJ 310-2005	Q/BQB 310-2009	SEW 092:95	EN 10149-2:1995	ISO 6930-1:2001	SAE J1392:2001	GB/T 20887.1-2007
S315MC	-	-	QStE300TM	S315MC	FeE315	045XLK	HR315F
S355MC	-	QStE340TM	QStE360TM	S355MC	FeE355	050XLK	HR355F
-	-	QStE380TM	QStE380TM	-	-	-	HR380F
S420MC	-	QStE420TM	QStE420TM	S420MC	FeE420	060XLK	HR420F
S460MC	-	QStE460TM	QStE460TM	S460MC	FeE460	-	HR460F
S500MC	-	QStE500TM	QStE500TM	S500MC	FeE500	070XLK	HR500F
S550MC	-	-	QStE550TM	S550MC	FeE550	080XLK	HR550F
S600MC	BS600MC	-	QStE600TM	S600MC	FeE600		HR600F
S650MC	-	-	QStE650TM	S650MC	FeE650	-	HR650F
S700MC	BS700MC	-	QStE690TM	S700MC	FeE700	-	HR700F



化学成份
Chemical composition

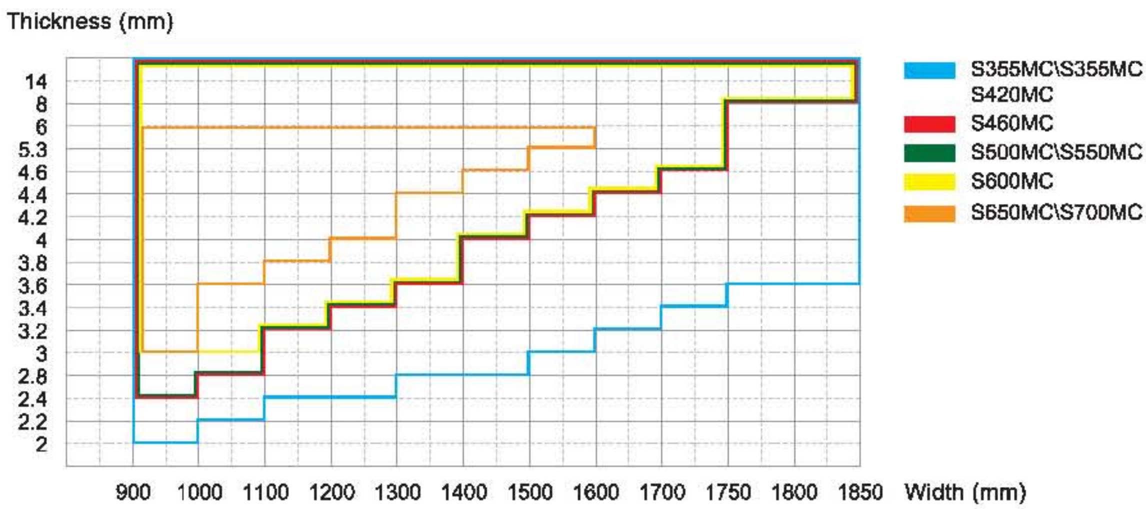
牌号 Grades	化学成分（熔炼分析）% Chemical composition (ladle analysis)										
	C	Mn	Si	P	S	Alt	Nb	V	Ti	Mo	B
S315MC	≤0.12	≤1.30	≤0.50	≤0.025	≤0.020	≥0.015	≤0.09	≤0.20	≤0.15	-	-
S355MC	≤0.12	≤1.50	≤0.50	≤0.025	≤0.020	≥0.015	≤0.09	≤0.20	≤0.15	-	-
S420MC	≤0.12	≤1.60	≤0.50	≤0.025	≤0.015	≥0.015	≤0.09	≤0.20	≤0.15	-	-
S460MC	≤0.12	≤1.60	≤0.50	≤0.025	≤0.015	≥0.015	≤0.09	≤0.20	≤0.15	-	-
S500MC	≤0.12	≤1.70	≤0.50	≤0.025	≤0.015	≥0.015	≤0.09	≤0.20	≤0.15	-	-
S550MC	≤0.12	≤1.80	≤0.50	≤0.025	≤0.015	≥0.015	≤0.09	≤0.20	≤0.15	-	-
S600MC	≤0.12	≤1.90	≤0.50	≤0.025	≤0.015	≥0.015	≤0.09	≤0.20	≤0.22	≤0.50	≤0.005
S650MC	≤0.12	≤2.00	≤0.60	≤0.025	≤0.015	≥0.015	≤0.09	≤0.20	≤0.22	≤0.50	≤0.005
S700MC	≤0.12	≤2.10	≤0.60	≤0.025	≤0.015	≥0.015	≤0.09	≤0.20	≤0.22	≤0.50	≤0.005

力学性能
Mechanical properties

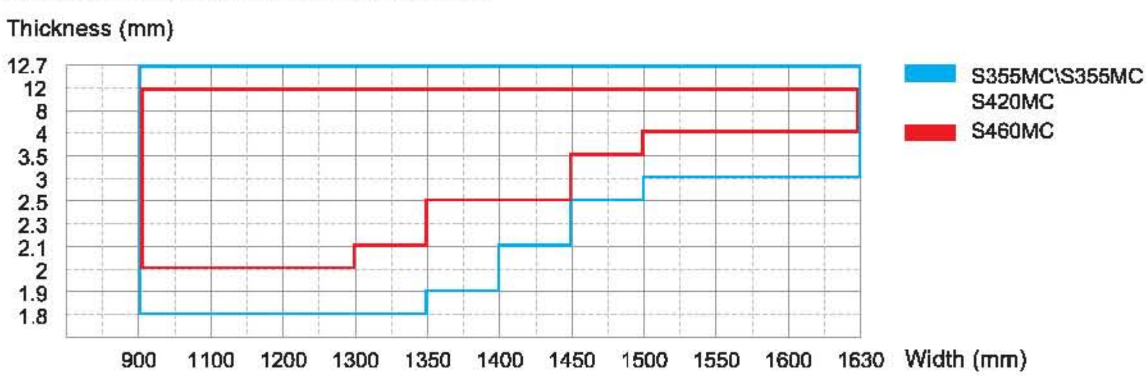
牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)				180° 弯曲试验 弯心直径 180° Bend test Inner diameter
	上屈服强度 Upper yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation % 公称厚度 Nominal thickness mm		
			<3	≥3	
			L_0=80mm,b=20mm	$L_0=5.65\sqrt{S_0}$	
S315MC	≥315	390~510	≥20	≥24	d=0a
S355MC	≥355	430~550	≥19	≥23	d=0.5a
S420MC	≥420	480~620	≥16	≥19	d=0.5a
S460MC	≥460	520~670	≥14	≥17	d=1a
S500MC	≥500	550~700	≥12	≥14	d=1a
S550MC	≥550	600~760	≥12	≥14	d=1.5a
S600MC	≥600	650~820	≥11	≥13	d=2a
S650MC	≥650	700~880	≥10	≥12	d=2a
S700MC	≥700	750~950	≥10	≥12	d=2a

可供范围
Available size

宝钢总部/Core Base



不锈钢事业部/Stainless Steel Business Unit



梅钢/Meishan



冷成形用先进高强度热连轧钢板及钢带

Hot-rolled advanced high strength cold forming steel

先进高强钢（AHSS）通常是指通过相变进行强化的钢种，组织中含有马氏体、贝氏体和/或残余奥氏体。包括双相钢、TRIP钢、复相钢和马氏体钢等。

先进高强钢的强度和塑性远远优于普通高强钢。高强度和高成形性的组合使它成为汽车行业偏爱的材料。

宝钢启动了对先进高强钢的研发，其中的双相钢已经成为一个成熟的产品。宝钢正在努力让其他产品早日实现大规模生产。

Advanced High Strength Steel, abbreviated as AHSS, is normally refers to the steel which gets strength by phase transition. The microstructure of AHHS consists of martensite, bainit and/or retained autensite. The types of AHHS includes dual phase steel, Trip steel, complex phase steel and martensitic steel.

The strength and formability of AHSS is much more excellent than normal high strength steel. Thanks to the combination of high strength and good formability, the AHSS is a preferred material for automobile industry.

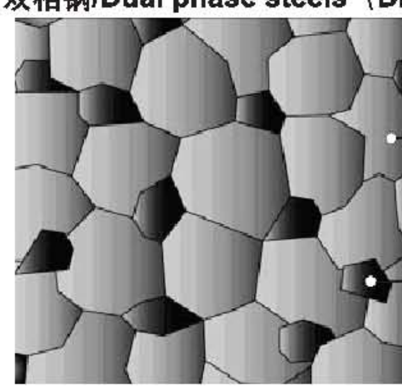
Baosteel has already launched the research of AHSS. Dual phase steel is now a common product of Baosteel. We are working hard to make other types of AHSS into massive production earlier.

双相钢/Dual phase steels（DP）

双相钢的显微组织主要为铁素体和马氏体，马氏体组织以岛状弥散分布在铁素体基体上。双相钢无时效，具有低的屈强比和较高的加工硬化指数以及烘烤硬化值，是结构类零件首选材料之一。

The microstructure of dual-phase steel is mainly ferrite and martensite, martensite island disperses in the ferrite matrix. Dual-phase steel has no aging effect. With low yield ratio, high work-hardening index and bake-hardening value, dual phase steel is a preferred material for automobile parts.

双相钢/Dual phase steels（DP）



高扩孔钢/High hole expansion steels（HE）

高扩孔钢有时也称为铁素体贝氏体钢（FB）或高凸缘翻边高强钢（SF）。

高扩孔钢的显微组织主要为铁素体和贝氏体组织；或主要为强化的铁素体单相组织或贝氏体单相组织。这种钢具有较高的抗拉强度、较高的成形性能和良好的凸缘翻边成形性能。

High hole expansion steel is sometimes referred to as ferritic bainitic steel (FB) or Stretch Flangeable steel (SF).

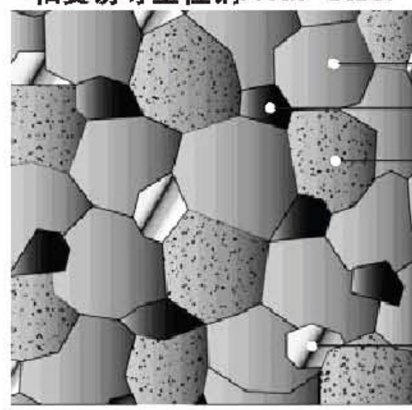
High hole expansion steel microstructure is mainly of ferrite and bainite; or mainly the enhanced ferrite single-phase organization or bainite single phase compositions. This steel has a higher tensile strength, high formability and a good flanging formability.

相变诱导塑性钢/Transformation induced plasticity steels（TRIP Steel）

钢的显微组织为铁素体、贝氏体和残余奥氏体，其中，残余奥氏体的含量最少不低于5%。在成形过程中，残余奥氏体可相变为马氏体组织，具有较高的加工硬化率、均匀伸长率和抗拉强度。与同等抗拉强度的双相钢相比，具有更高的延伸率。

The microstructure of TRIP steels is retained austenite embedded in a primary matrix of ferrite and bainite. The retained autensite should be no less than 5%. During the forming process, the retained autensite will transform into martensite which will lead to a high working-hardening rate, uniform elongation and high tensile strength. Compared with dual phase steel of same strength, the TRIP steel has a higher elongation.

相变诱导塑性钢/TRIP Steel



复相钢/Complex phase steels（CP）

钢的显微组织主要为以铁素体和（或）贝氏体组织为基体，并且通常分布少量的马氏体、残余奥氏体和珠光体组织。通过添加微合金元素Ti或Nb，形成细化晶粒或析出强化的效应。这种钢具有非常高的抗拉强度。与同等抗拉强度的双相钢相比，其屈服强度明显要高很多。这种钢具有较高的能量吸收能力和较高的残余应变能力。

The microstructure of CP steels contains small amounts of martensite,retained austenite and pearlite within ferrite/bainite matrix.An extreme grain refinement is created by retarded recrystallization or precipitation of microalloying elements like Ti or Nb.In comparison with DP- steels, CP steels show significantly higher yield strengths at equal tensile strengths of 800 MPa and greater. CP-steels are characterized by high energy absorption and high residual deformation capacity.

马氏体钢/Martensitic steels（MS）

马氏体钢的显微组织几乎全部为马氏体组织，具有较高的抗拉强度，一般在1000MPa以上。马氏体钢通常需进行回火处理以改善其塑性，使其在如此高的强度下，仍具有足够的成形性能。

The MS steels are characterized by a martensitic matrix. MS steel shows the highest tensile strength, usually more than 1000Mpa. MS steels are often subjected to post-quench tempering to improve ductility, and can provide adequate formability even at extremely high strengths.

供货标准、牌号与相当或相近牌号对照表
Reference list of steel grades and corresponding grades

Q/BQB312-2009	GMW3399-2008		EN 10338:2007(E)
BR330/580DP	HR580T/330Y-DP	HR DP600	HDT580X
BR450/780DP	HR780T/450Y-DP	HR DP800	-
BR400/590TR	HR590T/400Y-TR	HR TRIP600	HDT
BR450/780TR	HR780T/450Y-TR	HR TRIP800	-
BR300/450HE	HR450T/300Y-FB	HR FB450	HDT450F
BR440/580HE	HR580T/440Y-FB	HR FB600	HDT560F
BR600/780HE	HR780T/600Y-FB	HR FB800	-
BR900/1200MS	HR1200T/900Y-MS	HR MS1200	HDT1200M
BR650/780CP	HR780T/650Y-MP	HR MP800	HDT780C
BR720/950CP	HR950T/720Y-MP	HR MP1000	HDT950C

化学成分
Chemical composition

牌号 Grades	化学成分（熔炼分析）% Chemical composition (ladle analysis)							
	C	Si	Mn	P	S	Als	Cu	B
BR330/580DP	≤0.23	≤2.00	≤3.30	≤0.090	≤0.015	≥0.010	≤0.40	≤0.006
BR450/780DP	≤0.23	≤2.00	≤3.30	≤0.090	≤0.015	≥0.010	≤0.40	≤0.006
BR400/590TR	≤0.30	≤2.20	≤2.50	≤0.090	≤0.015	≥0.010	≤0.20	-
BR450/780TR	≤0.30	≤2.20	≤2.50	≤0.090	≤0.015	≥0.010	≤0.20	-
BR300/450HE	≤0.18	≤1.20	≤2.00	≤0.050	≤0.010	≥0.010	-	-
BR440/580HE	≤0.18	≤1.20	≤2.00	≤0.050	≤0.010	≥0.010	-	-
BR600/780HE	≤0.18	≤1.20	≤2.00	≤0.050	≤0.010	≥0.010	-	-
BR900/1200MS	≤0.30	≤2.20	≤3.00	≤0.020	≤0.025	≥0.010	≤0.20	-
BR650/780CP	≤0.25	≤2.00	≤2.20	≤0.050	≤0.015	≥0.010	≤0.20	-
BR720/950CP	≤0.25	≤2.00	≤2.20	≤0.050	≤0.015	≥0.010	≤0.20	-

力学性能
Mechanical properties

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)			n值 n value (10%~20%)
	下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation % (L_0=80mm,b=20mm)	
BR330/580DP	330~470	≥580	≥19	≥0.14
BR450/780DP	450~610	≥780	≥14	≥0.11

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)			n值 n value (10%~20%)
	下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation % (L_0=80mm,b=20mm)	
BR400/590TR	≥400	≥590	≥24	0.19
BR450/780TR	≥450	≥780	≥20	0.15

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)			扩孔率 Hole expansion ratio %
	下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation % (L_0=80mm,b=20mm)	
BR300/450HE	300~380	≥450	≥24	≥80
BR440/580HE	440~620	≥580	≥14	≥75
BR600/780HE	600~800	≥780	≥12	≥55

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)			180° 弯曲试验 180° Bend test
	下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation % (L_0=80mm,b=20mm)	
BR900/1200MS	900~1150	≥1200	≥5	d=8a

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)		
	下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation % (L_0=80mm,b=20mm)
BR650/780CP	650~800	780	10
BR720/950CP	720~920	950	9

建筑结构用热连轧钢板及钢带
Hot-rolled building structural steel

宝钢生产的建筑结构用钢具有碳当量低、焊接性能好、强度高、屈强比低的特点。该类产品已通过JIS认证，被广泛用于建筑、制管行业。

With the advantage of low carbon equivalent, good welding performance, high strength and low yield ratio , the building structural steel from Baosteel has passed the JIS certification, and been widely used in building and pipe industries.



供货标准、牌号与相当或相近牌号对照表
Reference list of steel grades and corresponding grades

Q/BQB313-2009	JIS G3136-2005	ISO 24314:2006	GB/T19879-2005
SN400A	SN400A	-	-
SN400B	SN400B	S235S	Q235GJ-C
SN490B	SN490B	S325S	Q345GJ-C

化学成分
Chemical composition

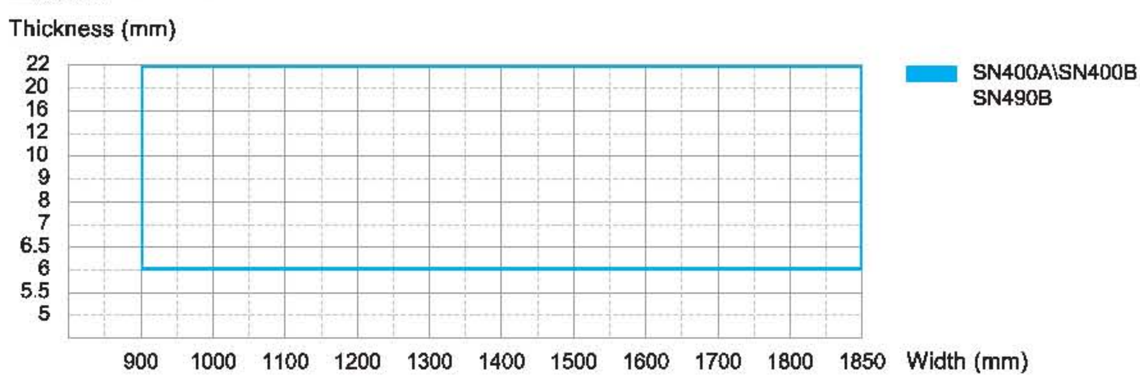
牌号 Grades	化学成分（熔炼分析）% Chemical composition (ladle analysis)%						Ceq. %	Pcm. %
	C	Si	Mn	P	S	其他 Others		
SN400A	≤0.24	-	-	≤0.050	≤0.050	根据需要可添加其它合金元素 Other elements may be addedd on the manufacturer's option	-	-
SN400B	≤0.20	≤0.35	0.60~1.40	≤0.030	≤0.015		≤0.36	≤0.26
SN490B	≤0.18	≤0.55	≤1.60	≤0.030	≤0.015		≤0.44	≤0.29

力学性能
Mechanical properties

牌号 Grades	公称厚度 Nominal thickness mm	拉伸试验（横向）Tensile test (transverse) (L_0=200mm,b=40mm)				V型冲击试验 V-notch impact test 厚度>12mm Thickness >12mm	
		上屈服强度 Upper yield strength MPa	抗拉强度 Tensile strength MPa	屈强比 Yield ratio	伸长率 Elongation %	试验温度 Temperature ℃	冲击功 Energy J
SN400A	6~16	≥235	400~510	-	≥17	-	-
	>16	≥235	400~510	-	≥21	-	-
SN400B	6~<12	≥235	400~510	-	≥18		≥27
	12~16	235~355	400~510	≤0.80	≥18		≥27
	>16	235~355	400~510	≤0.80	≥22		≥27
SN490B	6~<12	≥325	490~610	-	≥17		≥27
	12~16	325~445	490~610	≤0.80	≥17		≥27
	>16	325~445	490~610	≤0.80	≥21		≥27

可供范围
Available size

宝钢总部/Core Base



船体结构用热连轧钢板和钢带
Hot-rolled hull structural steel

宝钢生产的船体结构用热连轧钢板具有板形良好，尺寸精度高，焊接性能好，冲击性能高的特点。产品控制体系完备，已通过中国船级社(CCS)、挪威船级社(DNV)德国劳氏船级社(GL)、美国船级社(ABS)、英国劳氏船级社(LR)、法国船级社(BV)、意大利船级社(RINA)、韩国船级社(KR)、日本海事协会(NK)的认证，被各大造船厂使用。

The hot-rolled hull structural steel from Baosteel has the feature of good shape, precise size tolerance, good weldablity and impact performance. The products have passed the main classification societies in the world, such as CCS, DNV, GL, ABS, LR, BV, RINA, KR AND NK. The hot-rolled hull structural steel of Baosteel is widely used in the ship manufacturing industry.



供货标准、牌号与相当或相近牌号对照表
Reference list of steel grades and corresponding grades

具体参照各个船级社要求执行
According to the classification societies

化学成分
Chemical composition

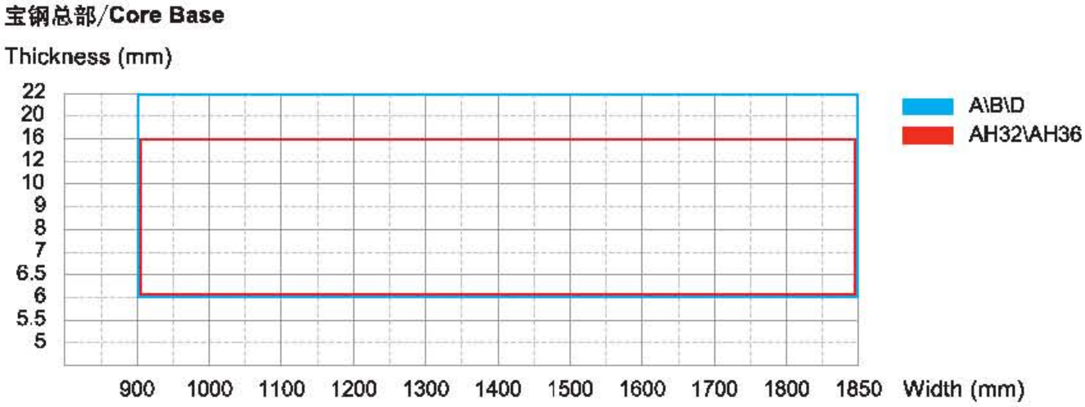
用途 Usage	钢级 Grades	化学成分（熔炼分析）Chemical composition(ladle analysis) %									
		C	Mn	Si	P	S	Alt	Nb	V	Ti	Nb+V+Ti
一般强度船体结构用 Normal strength hull structural steel	A	≤ 0.21	≥2.5×C	≤ 0.035	≤ 0.035	≤ 0.035	≤ 0.035	–	–	–	–
	B	≤ 0.21	0.80~1.40	≤ 0.035	≤ 0.035	≤ 0.035	≤ 0.035	–	–	–	–
	D	≤ 0.21	0.60~1.40	0.10 ~ 0.35	≤ 0.035	≤ 0.035	≤ 0.035	–	–	–	–
高强度船体结构用 High strength hull structural steel	AH32	≤ 0.18	0.90~1.60	≤ 0.50	≤ 0.50	≤ 0.030	≥ 0.020	0.02 ~ 0.05	0.05 ~ 0.10	≤ 0.02	≤ 0.12
	AH36	≤ 0.18	0.90~1.60	≤ 0.50	≤ 0.50	≤ 0.030	≥ 0.020			≤ 0.02	≤ 0.12

力学性能
Mechanical properties

钢级 Grades	拉伸试验（横向） Tensile test (transverse)			冲击试验 Impact test		
	上屈服强度 Upper yield strength MPa	抗拉强度 Tensile strenth MPa	伸长率 Elongation% $L_0=5.65\sqrt{S_0}$ %	试验温度 Temperature ℃	平均冲击功 Average energy J	
					纵向	横向
A	≥235	400～490	≥22	-	-	-
B	≥235	400～490	≥22		≥27	≥20
D	≥235	400～490	≥22	-20	≥27	≥20
AH32	≥315	440～570	≥22		≥31	≥22
AH36	≥355	490～620	≥21		≥34	≥24

可供范围
Available size

宝钢总部/Core Base



耐腐蚀结构用热连轧钢板及钢带

Hot-rolled anti-corrosion structural steel

耐腐蚀结构用钢通过添加Cu、Cr、Ni等合金元素，使结构钢具有了耐腐蚀性，延长了使用寿命。宝钢在耐腐蚀结构的开发、生产上具有丰富的经验。成熟钢种B480GNQR被广泛应用在集装箱行业，而新钢种B600GNQR的开发则是为了满足集装箱行业的减薄减重趋势。在铁路用钢方面，宝钢在国内率先研制开发成功屈服强度400至550MPa的高强度耐大气腐蚀钢热轧板卷，牌号采用Q450NQR1等。这些钢种在良好的耐候性之外，还具有优良的低温冲击韧性，适合各种极端气候下的使用。

宝钢的耐腐蚀结构用钢加工简便，适合焊接加工和冷弯成型。目前这些钢种已在集装箱、铁道行业得到广泛推广应用。



With alloy elements, such as Cu, Cr, Ni, added, the anti-corrosion structural steel acquires a corrosion resistance ability and extends the service life. In the development and producing of anti-corrosion structural steel, Baosteel has rich experience. B480GNQR, a mature product, has been widely used for a long time, and B600GNQR, first developed by Baosteel in China, was to meet the trend of "strength higher, weight lighter" of the marine container industry.

In the field of railway steel, Baosteel is the first in China who developed the high strength(yield strength: 400~550MPa) atmospheric corrosion resistance steel. Q450NQR1, with good low temperature toughness and corrosion resistance, can serve in many extreme climates.

Suitable for welding and bending, Baosteel's anti-corrosion structural steel is easy to use, and widely used in the field of marine container and railway industries.

化学成分

Chemical composition

牌号 Grades	化学成分（熔炼分析）% Chemical composition(ladle analysis)							
	C	Si	Mn	P	S	Cr	Cu	其它 Others
B460NQR	≤0.10	0.12~0.35	≤1.00	0.06~0.12	≤0.030	-	0.20~0.40	Ti≤0.10
B490NQR	≤0.12	0.15~0.55	≤1.20	0.06~0.12	≤0.030	-	0.20~0.45	Ti≤0.10
B480GNQR	≤0.12	0.25~0.75	0.20~0.50	0.07~0.15	≤0.030	0.30~1.25	0.25~0.55	Ni≤0.65
B600GNQR	≤0.12	≤0.75	≤2.00	≤0.020	≤0.008	0.10~1.25	0.10~0.55	Ni≤0.65
Q400NQR1	≤0.12	≤0.75	≤1.10	≤0.025	≤0.020	0.30~1.25	0.20~0.55	Ni≤0.65
Q450NQR1	≤0.12	≤0.75	≤1.50	≤0.025	≤0.020	0.30~1.25	0.20~0.55	Ni≤0.65
Q500NQR1	≤0.12	≤0.75	≤2.00	≤0.025	≤0.020	0.30~1.25	0.20~0.55	Ni≤0.65
Q550NQR1	≤0.16	≤0.75	≤2.00	≤0.025	≤0.020	0.30~1.25	0.20~0.55	Ni≤0.65

力学性能
Mechanical properties

牌号 Grades	公称厚度 Nominal thickness mm	拉伸试验（纵向） Tensile test (longitudinal) $L_0=5.65\sqrt{S_0}$			180° 弯曲试验 180° Bend test	V型冲击试验 V-notch impact test		
		下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation %		试验温度 Temperature ℃	试样尺寸 Specimen Size	冲击功 Energy J
B460NQR	3.0～6.0	≥340	≥460	≥23	a	-	-	-
B490NQR	4.5～6.0	≥390	≥490	≥23	a	-	-	-
	>6.0～12.0	≥390	≥490	≥23	1.5a	-10	10×5.0	≥14
							10×7.5	≥20
							10×10	≥27
B480GNQR	≤6.0	≥350	≥480	≥22	a	-10	10×10	≥27
	>6.0	≥350	≥480	≥22	2a	-10	10×10	≥27
B600GNQR	1.5～8.0	≥550	≥600	≥18	2a	-	-	-

备　注：B600GNQR 拉伸试验（横向），上屈服强度。
Remark: B600GNQR Tensile test (transverse), Upper yield strength.

牌号 Grades	公称厚度 Nominal thickness mm	拉伸试验（横向） Tensile test (transverse) $L_0=5.65\sqrt{S_0}$			180° 弯曲试验 b≥35mm 弯心直径 180° Bend test b≥35mm Inner diameter	V型冲击试验 V-notch Impact test	
		下屈服强度 Lower yield strength MPa	抗拉强度 Tensile test MPa	伸长率 Elongation %		试验温度 Temperature ℃	冲击功 Energy J
Q400NQR1	≤6	≥400	≥500	≥24	a	-40	≥60
	>6～14	≥400	≥500	≥22	2a	-40	≥60
	>14	≥400	≥500	≥20	3a	-40	≥60
Q450NQR1	≤6	≥450	≥550	≥22	a	-40	≥60
	>6～14	≥450	≥550	≥20	2a	-40	≥60
	>14	≥450	≥550	≥19	3a	-40	≥60
Q500NQR1	≤6	≥500	≥600	≥18	a	-40	≥60
	>6～14	≥500	≥600	≥18	2a	-40	≥60
Q550NQR1	≤6	≥500	≥600	≥18	a	-40	≥60
	>6～12	≥500	≥600	≥18	2a	-40	≥60

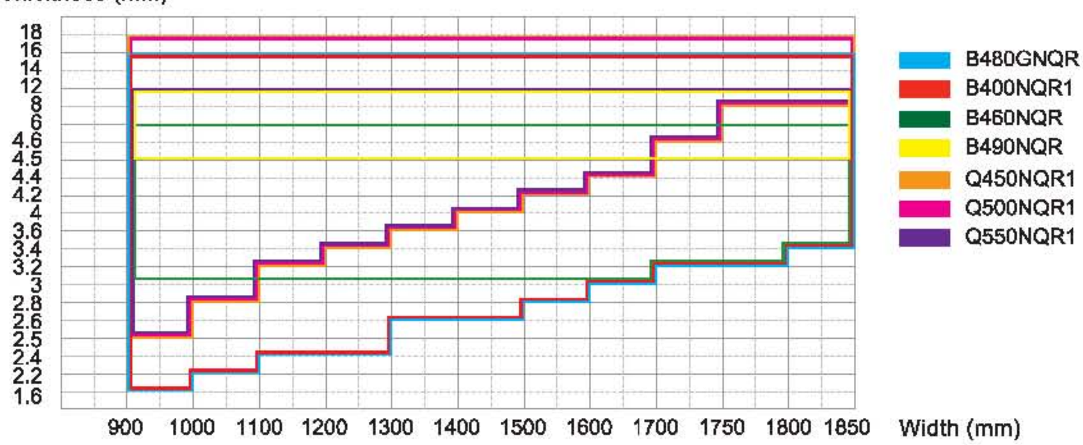
耐腐蚀性能
Anti-corrosion ability

牌号 Grades	锈层厚度 Rusty layer thickness	平均厚度 Average rust thickness	形貌特征 Morhpology
普碳钢 Normal carbon steel	8.0um~17.0μm	12.5μm	疏松、易脱落 Loose, easy-off
B480GNQR	4.0um~8.0μm	7.0μm	致密、裂纹少、牢固 Dense, crack less, solid

可供范围
Available size

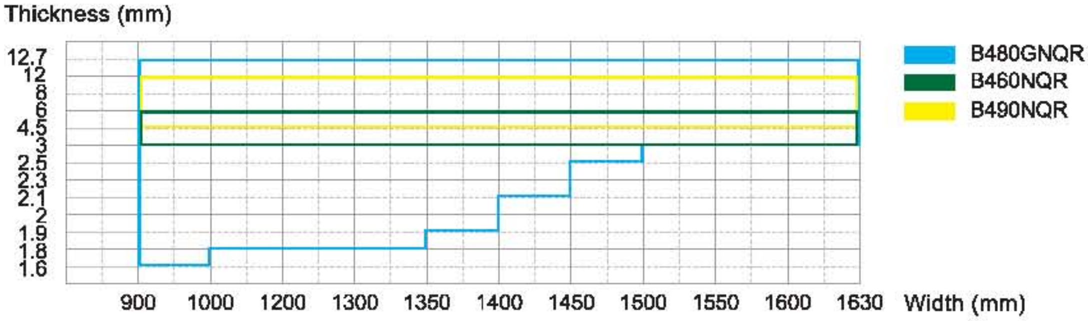
宝钢总部/Core Base

Thickness (mm)



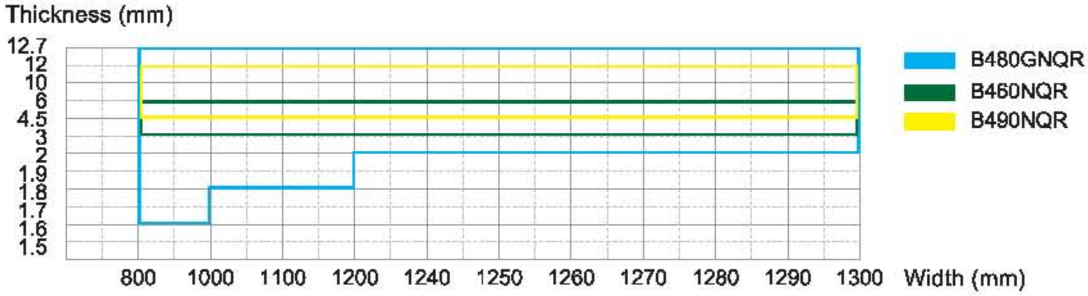
不锈钢事业部/Stainless Steel Business Unit

Thickness (mm)



梅钢/Meishan

Thickness (mm)



表面硬化钢热连轧钢板及钢带
Hot-rolled case-hardening steel

表面硬化钢是一种具有较低碳含量的优质结构钢。经过成型之后，对其进行渗碳或者渗氮工艺，淬火工艺，可以得到具有耐磨高硬度的表面和高韧性芯部的结构件。

Case-hardening steel is a high quality low carbon steel. After forming, carburizing or nitriding process and quenching or other heat treatment, a structural part with wear-resistant surface and tough core can be achieved.



供货标准、牌号与相当或相近牌号对照表
Reference list of steel grades and corresponding grades

Q/BQB313-2009	JIS G4051-2005	DIN 17210
C10	-	C10
C15	-	C15
S09CK	S09CK	-
S15CK	S15CK	-

化学成分
Chemical composition

牌号 Grades	化学成分（熔炼分析）% Chemical composition(ladle analysis)					
	C	Si	Mn	P	S	残余元素 Residual elements
C10	0.07~0.13	≤0.40	0.30~0.60	≤0.035	≤0.035	Cu≤0.20 Ni≤0.15 Cr≤0.15 As≤0.05 Sn≤0.05
C15	0.12~0.18	≤0.40	0.30~0.60	≤0.035	≤0.035	
S09CK	0.07~0.12	0.10~0.35	0.30~0.60	≤0.025	≤0.025	
S15CK	0.13~0.18	0.15~0.35	0.30~0.60	≤0.025	≤0.025	

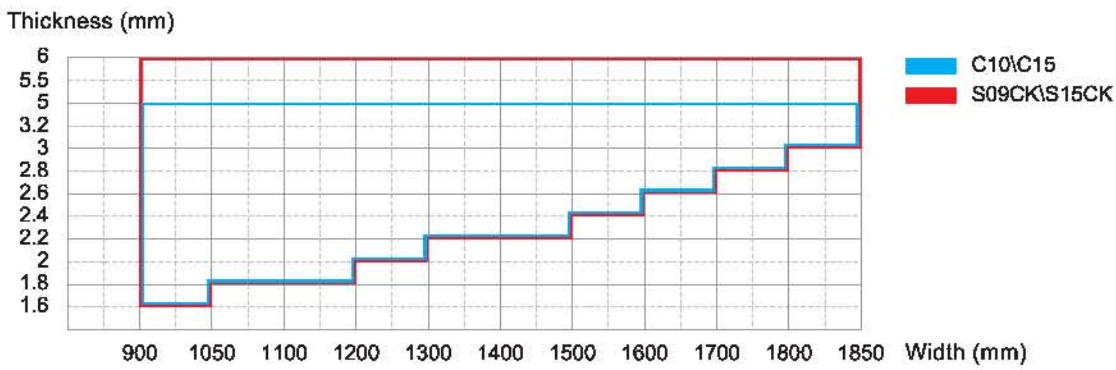
热处理后力学性能
Mechanical properties after heat treatment

牌号 Grades	淬火温度 Quenching temperature ℃	渗碳温度 Carburizing temperature ℃	淬火 Quenching		回火温度 Temper temperature ℃	处理后典型力学性能 Typical properties after treatment			
			芯部淬火温度 Core quenching temperature ℃	表面淬火温度 Surface quenching temperature ℃		屈服强度 Yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation L_0=5d %	断面收缩率 Reduction of area %
C10	900±10	880~980	880~920	780~820	150~200	390	640~785	≥13	≥35
C15	900±10	880~980	880~920	780~820	150~200	440	735~880	≥12	≥30

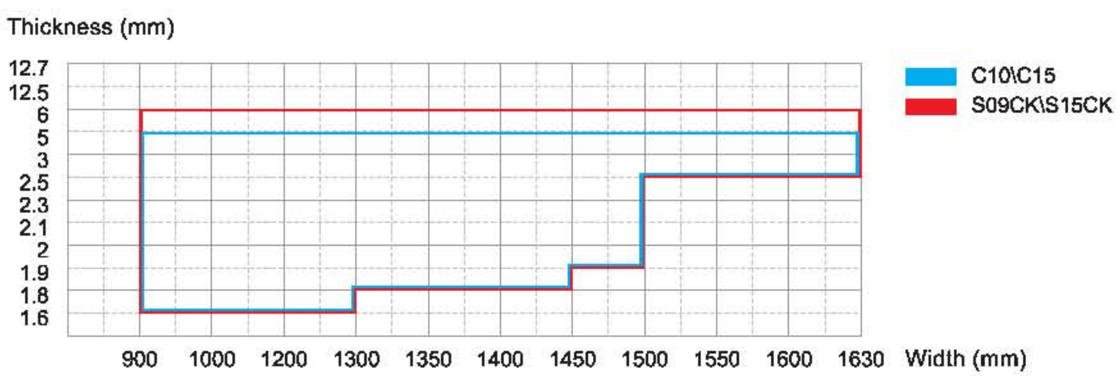
牌号 Grades	正火温度 Normalizing temperature ℃	退火温度 Annealing temperature ℃	淬火 Quenching		回火 Tempering temperature	淬火+回火的性能 Properties after quenching and tempering			
			芯部淬火温度 Core quenching temperature ℃	表面淬火温度 Surface quenching temperature ℃		屈服强度 Yield strength MPa	抗拉强度 Tensile strength MPa	伸长率 Elongation L_0=50mm b=25mm %	硬度 Hardness HB
S09CK	900~950 气冷 Air cooling	约900 炉冷 Furnace cooling	880~920 油(水)冷 Oil or water cooling	750~800 水冷 Water cooling	50~200 气冷 Air cooling	≥245	≥390	≥23	121~179
S15CK	880~930 气冷 Air cooling	约880 炉冷 Furnace cooling	870~920 油(水)冷 Oil or water cooling	750~800 水冷 Water cooling	50~200 气冷 Air cooling	≥343	≥490	≥20	143~235

可供范围
Available size

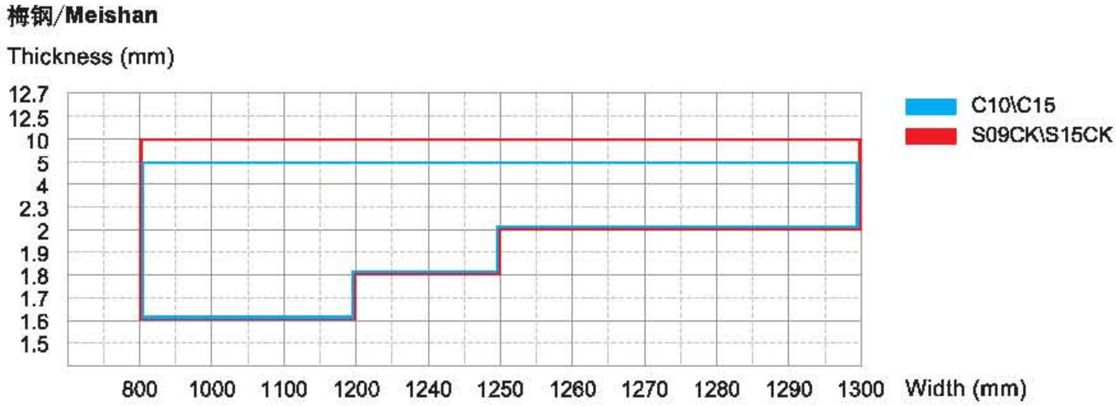
宝钢总部/Core Base



不锈钢事业部/Stainless Steel Business Unit



梅钢/Meishan



直缝焊套管用热连轧钢带
Hot-rolled steel for straight welded casing and tube

J55直缝焊套管用钢主要用于生产石油用焊管或套管。宝钢具有长期的生产经验，生产的J55钢带具有钢质纯净、强度高、韧性好、屈强比低的特点，经加工后得到的成品能满足API和用户的额外要求。

The steel, J55 is mainly used to produce the casing or tube in petroleum industry. Baosteel has a long history to make J55. With pure composition, high strength, good toughness and low yield ratio, J55 strip is qualified for a final product which meets the API standard and users' additional requirements.



供货标准与牌号
Standard

可参照API 5CT或者与用户签订的协议
According to API 5CT or technical agreements

化学成分
Chemical composition

牌号 Grades	化学成分（熔炼分析）Chemical composition(ladle analysis) %							
	C	Si	Mn	P	S	Nb	V	Ti
J55	≤0.20	≤0.45	≤1.50	≤0.025	≤0.020	≥0.005	≥0.005	≥0.005

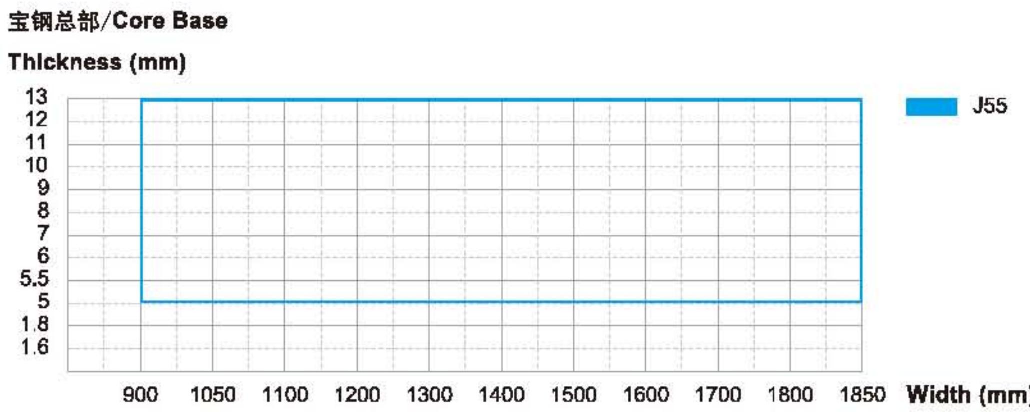
备注：
a.允许加入Cu≤0.30%和Ni≤0.25%。
b.由供方选择，可在Nb、V、Ti三种元素中或添加其中一种，或添加它们的任一组合，当只加入其中一种元素时，该元素的最低含量应符合本表规定。

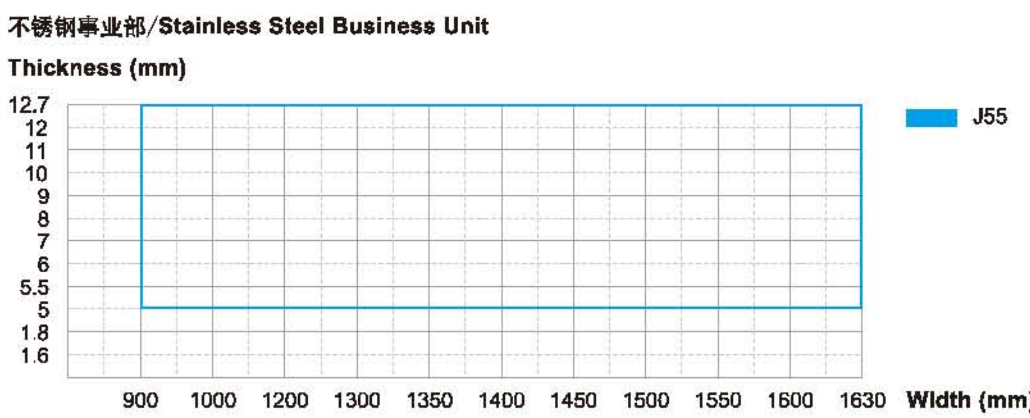
Remarks:
a. Cu no more than 0.30% or Ni no more than 0.25% is allowed
b. Nb, V, Ti or any combination thereof may be added on the manufacturer's option. If only one of the 3 elements is added, the added element should meet the requirement in the table above.

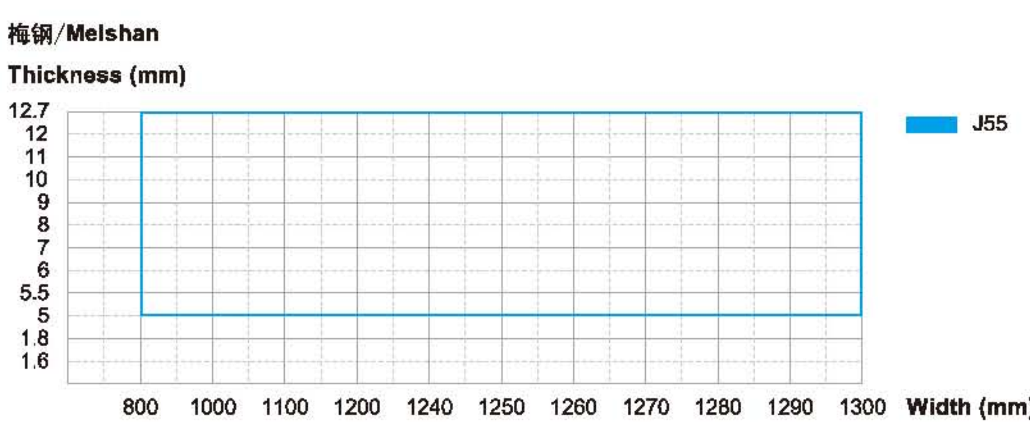
力学性能
Mechanical properties

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)			冲击试验 Impact test	
	屈服强度 Yield strength Rt0.5 MPa	抗拉强度 Tensile strength Rm MPa	伸长率 Elongation % (L_0=50mm,b=38mm)	试样尺寸 Specimen Size mm×mm	-10℃冲击功J Energy at -10℃
J55	380～550	≥520	≥24	7.5×10.0	≥42
				5.0×10.0	≥28

可供范围
Available size







热连轧花纹钢板及钢带

Hot-rolled checker steel

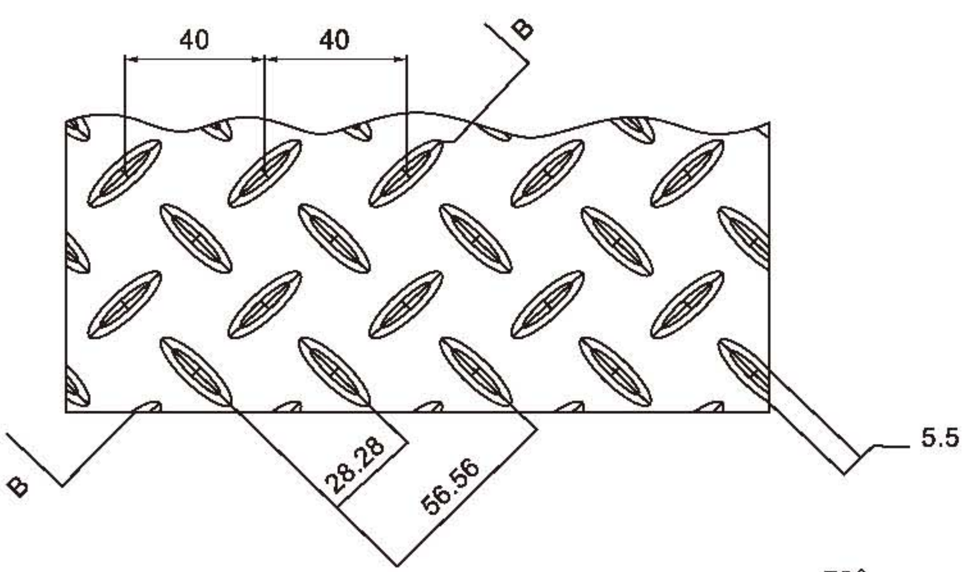
花纹用钢目前只在梅山公司生产，其牌号主要通过代表花纹的"H"与引用标准（GB/T 700、GB/T 709，JIS G3131等）中的牌号组合而成，主要用于船只甲板或建筑结构使用。

Hot-rolled checker steel is manufactured in Meishan Base. The grades are initialed with "H", and followed by the grades in other common standards, such as GB/T 700, GB/T 709, JIS G3131 and etc. Meishan makes hot-rolled checker plate with good mechanical quality and nice surface. The product is widely used in marine or construction industries.

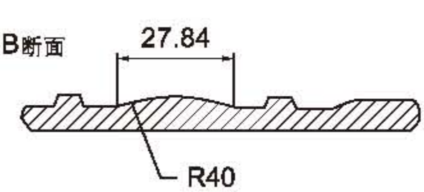


热轧花纹钢花纹形状

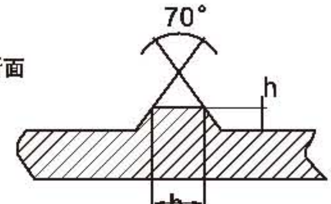
The pattern of the hot-rolled checker steel



B-B断面



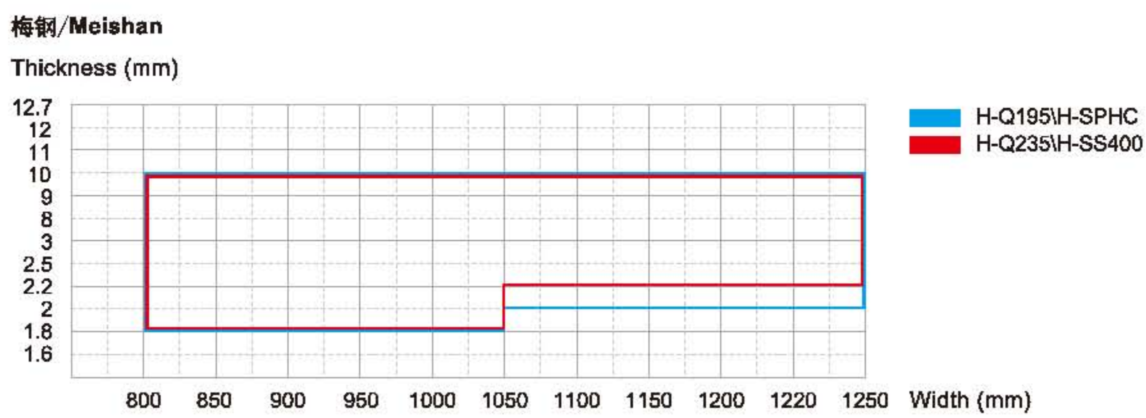
棱的断面



力学性能
Mechanical properties

牌号 Grades	拉伸试验（纵向） Tensile test (longitudinal)	
	下屈服强度 Lower yield strength MPa	抗拉强度 Tensile strength MPa
H-Q195	≥195	≥270
H-Q235	≥235	≥320
H-Q345	≥345	≥370

可供范围
Available size





搪瓷用高强度热连轧钢板和钢带
Hot-rolled high strength enameling steel

宝钢的BTC系列钢材是专门为搪瓷制品而开发的。搪瓷钢具有较高强度与延伸率，因此具有成型性能好的特点，易于被加工成需要的形状。同时材料有着较好的表面，与釉料的粘附牢固，特殊的成份也使它具有优秀的抗鳞爆能力。该材料适合干法和湿法搪瓷工艺，被广泛用于搪瓷行业，特别是生产热水器内胆。

The BTC series steel was specially developed by Baosteel for enamel products. With good strength and high elongation, the enameling steel has a good formability and can be easily formed into the required shape. It also has high surface quality, good adhesion with frits , and the unique composition can prevent fishscaling. Baosteel's enameling steel is suitable for wet or dry application process and widely used in enamel industries, especially to make the inner pot of water heater.



供货标准、牌号
Reference list of steel grades

标准 Standard	牌号 Grades
BZJ 308-2009	BTC210R、BTC245R、BTC330R、BTC360R

化学成分
Chemical composition

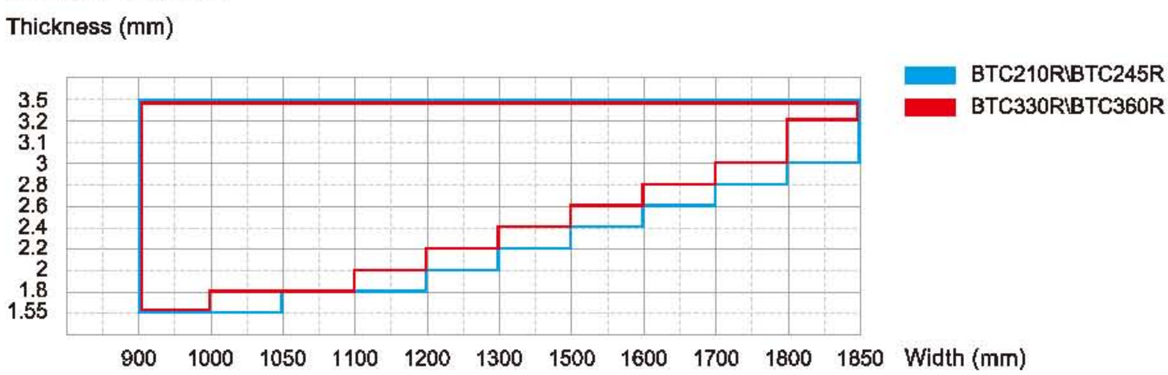
牌号 Grades	化学成分（熔炼分析）% Chemical composition (ladle analysis)					
	C	Si	Mn	P	S	Alt
BTC210R	≤0.12	≤0.05	≤0.70	≤0.035	≤0.035	≥0.010
BTC245R	≤0.12	≤0.05	≤0.70	≤0.035	≤0.035	≥0.010
BTC330R	≤0.16	≤0.05	≤0.90	≤0.035	≤0.035	≥0.010
BTC360R	≤0.16	≤0.05	≤0.90	≤0.035	≤0.035	≥0.010

力学性能
Mechanical properties

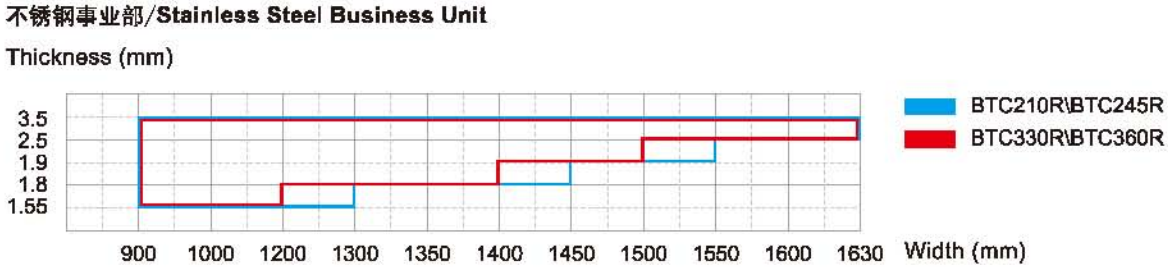
牌号 Grades	拉伸试验（纵向）Tensile test (longitudinal) (L_0=50mm,b=12.5mm)		
	下屈服强度 Lower yield stength MPa	抗拉强度 Lower yield stength MPa	伸长率 Elongation %
BTC210R	≥210	≥300	≥28
BTC245R	≥245	≥340	≥26
BTC330R	厚度<1.60mm:≥290 厚度≥1.60mm:≥330	≥400	≥22
BTC360R	≥360	≥440	≥22

可供范围
Available size

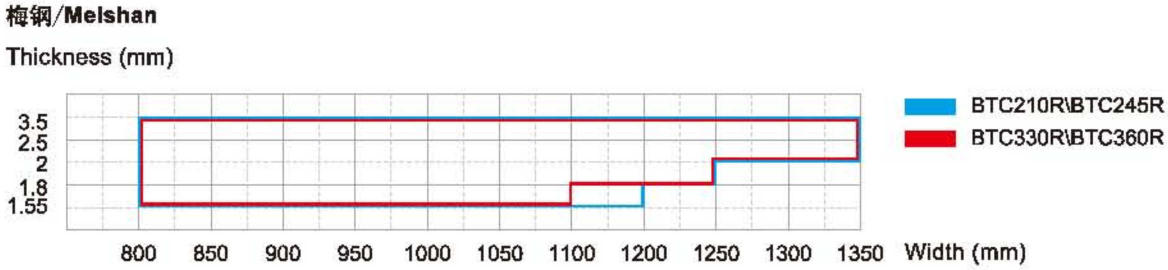
宝钢总部/Core Base



不锈钢事业部/Stainless Steel Business Unit



梅钢/Meishan



刀模和锯片用热连轧钢板及钢带
Hot-rolled die-cutting and sawblade steel

刀模锯片钢具有较高的碳含量和合金元素，经过加工和热处理后具有很高的硬度，可以满足刀模和锯片的要求。宝钢生产的刀模材料具有成分稳定，组织均匀，夹杂少的特点，被广泛应用于这些行业。

Die-cutting and sawblade steel has a high carbon and alloy content. After forming and suitable heat treatment, the hardness of the steel will be very high, which meets the requirements to make die-cutting and saw blades. Baosteel has produced die-cutting and sawblade steel with stable composition, uniformity and low inclusions, which is widely used in these industries.



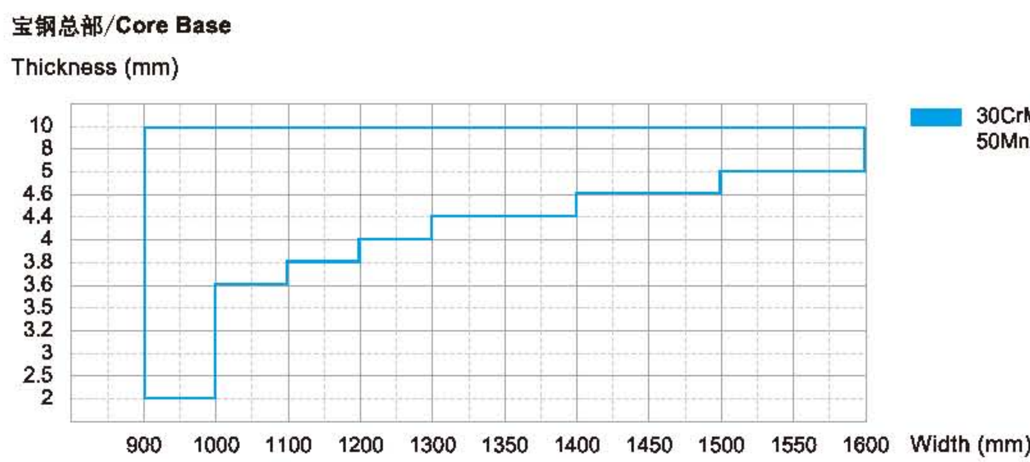
化学成分
Chemical composition

牌 号 Grades	化学成分（熔炼分析）Chemical composition(ladle analysis) %							
	C	Si	Mn	P	S	Cr	Mo	V
30CrMo	0.26~0.34	0.10~0.30	0.40~0.70	≤0.020	≤0.010	0.80~1.10	0.15~0.25	-
65Mn	0.62~0.70	0.17~0.37	0.90~1.20	≤0.020	≤0.010	≤0.30	-	-
50Mn2V	0.48~0.57	≤0.30	1.40~1.80	≤0.035	≤0.035	≤0.30	-	0.08~0.16
75Cr1	0.72~0.80	0.20~0.45	0.60~0.90	≤0.020	≤0.010	0.30~0.60	-	-

推荐热处理工艺及力学性能
Recommended heat treatment and mechanical properties

牌号 Grades	淬火+回火 Quenching and tempering		
	淬火温度 Quenching temperature ℃	回火温度 Tempering temperature ℃	洛氏硬度 HRC
30CrMo	880 ℃油冷/Oil cooling	400~430	≥33
65Mn	820 ℃油冷/Oil cooling	400~430	≥40
50Mn2V	830 ℃油冷/Oil cooling	400~430	≥40
75Cr1	810 ℃油冷/Oil cooling	400~430	≥40

可供范围
Available size





热轧产品使用技术
Guide for the using of hot-rolled steels

选材

选用钢材时需要考虑到两个因素，一方面是材料的可加工性，另一方面是材料的使用性能。通常在加工时我们希望材料的强度低，延伸率好，以便于切割、冲压、成形；而在使用时，我们希望材料的强度高，冲击性能好，能够承受苛刻的使用条件。为此我们要根据材料的力学性能来作出判断。

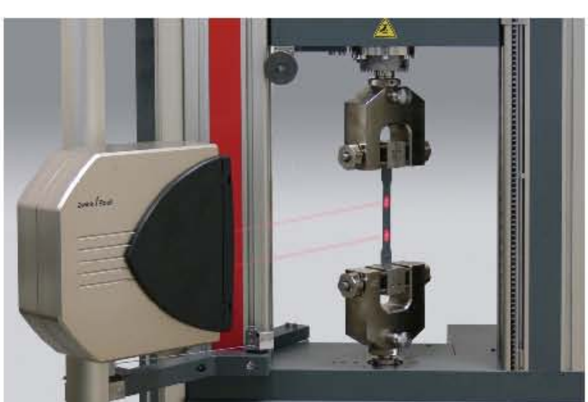
力学性能测试中主要的指标有：

屈服强度：屈服强度就是材料开始产生塑性变形时所对应的应力。在屈服点之前材料的变形是弹性的，当外加应力去除之后就会回复原来的形状。当应力超过屈服点后，部分变形就留为不能回复的永久变形。

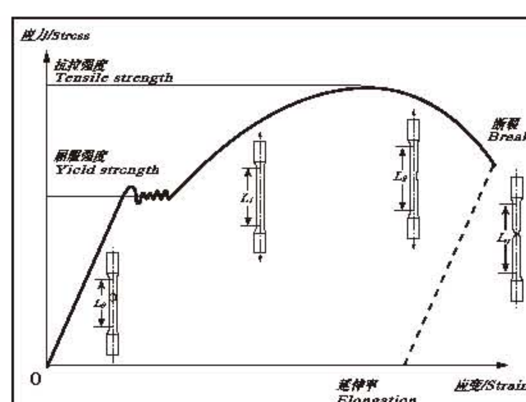
抗拉强度：试样拉伸时，在拉断前所承受的最大应力值。通常抗拉强度对应的是发生缩颈时的应力。

伸 长 率：伸长率，又名断后伸长率，指的是试样在拉断后，其标距部分所增加的长度与原标距长度的百分比。伸长率越大，则材料在受力破坏前可以经受的永久变形越大，成形性能也就越好。

屈服强度、抗拉强度、延伸率一般通过拉伸试验来进行测量。



拉伸试验/Tensile test



拉伸曲线/Stress-strain curve

冲 击 功：冲击功，或者韧性，指在冲击试验时，试样在冲击下折断时所吸收的功。单位为焦耳（J）。冲击功显示了材料对冲击负荷的抵抗能力。它通过夏比V型冲击试验测量。

如果材料在加工过程中还需要使用焊接，那就要考虑到材料的焊接性能。

焊　　接：对于钢材而言，焊接是将独立的钢材结合在一起的工艺，焊接部位通常需融熔在一起，之后凝固形成强力的结合，比如电弧焊，气体焊，电阻焊。

可 焊 性：又称结合能力，对于材料而言是指它们被焊接在一起的能力。大部分钢材都是可焊的，但其中一些更容易。而这个性质对于焊接质量和工艺选择都有很大的影响。

碳 当 量：在焊接中，碳当量（CE）用来衡量钢材的可焊性。碳当量公式显示了不同合金对于焊接影响的程度大小。高的碳含量和合金元素，如锰、铬、硅、钼、铜、镍，都会增加钢材的硬度，降低它的可焊性。碳当量通常推荐用以下公式计算：

$$CE=C+\frac{Mn}{6}+\frac{Cr+Mo+v}{5}+\frac{Ni+Cu}{15}$$

Selecting of steel

We shall take the following two factors into consideration when selecting steel, the one is the machinability of the steel, the other is the service character

During the processing, we hope the steel has a low strength and high elongation, which make it easy to cut, stamp or form. But in the service of steel, we hope it has high strength, good impact performance to suffer extreme service condition. For these two reasons, we should select suitable steel from its mechanical properties.

Mainly, mechanical properties include:

Yield strength: The yield strength or yield point of a material is defined in engineering and materials science as the stress at which a material begins to deform plastically. Prior to the yield point the material will deform elastically and will return to its original shape when the applied stress is removed. Once the yield point is passed some fraction of the deformation will be permanent and non-reversible.

Tensile strength: Tensile strength is indicated by the maximum stress before the break of a specimen. In general, it indicates when necking will occur.

Elongation: Elongation, or percent elongation at break, is defined as the change in gauge length after break per unit of the original gauge length. A high elongation means the material can stand great permanent deformation before break, or high deformability.

The parameter yield strength, tensile strength, elongation are measured by tensile test.

Impact energy: Impact energy, or toughness, is determined by the energy absorbed by the specimen during fracture in the impact test. It is measured in units of joules. Impact energy indicates material's resistance to impact load. It is tested by charpy V-notch test.

If welding is required during the process, we should consider the welding performance of the steel.

Welding: For the steel, welding is a fabrication to combine different pieces of steel together. In the welding, normally the binding sites melt together and cool to form a strong joint, such as electric arc welding, gas welding and electric resistance welding.

Weldability: Weldability, also known as joinability, of a material refers to its ability to be welded. Most steels can be welded, but some are easier to weld than others. It greatly influences weld quality and is an important factor in choosing which welding process to use.

Carbon equivalenc: In welding, Carbon Equivalenc(CE) is used to indicate the weldability of a steel. The CE formula shows the different influence of an alloy to weldability. Higher concentrations of carbon and other alloying elements such as manganese, chromium, silicon, molybdenum, vanadium, copper, and nickel tend to increase hardness and decrease weldability. The formula of CE is recommended as:

$$CE=C+\frac{Mn}{6}+\frac{Cr+Mo+v}{5}+\frac{Ni+Cu}{15}$$

运输及仓储

在钢材的运输和仓储过程中需要注意以下这些环节：

吊装：钢卷、钢板在吊装的时候建议使用专门的吊具。仅仅使用钢丝绳时容易滑动造成危险，同时也容易压伤、划伤钢材，造成缺陷。

堆垛：钢卷在堆放的时候，建议在下面铺设保护材料，如橡胶板等，避免钢卷表面压伤。钢板堆放时须使用垫木，垫木应当有相同的高度，同时彼此距离相等、合适，使钢板的重量能够均匀分布，避免造成板形问题。

存放：钢材推荐存在在室内，如果室外存放时应当覆盖雨布。在室内存放时，应当注意监控室内的温度与湿度，避免因为气温与湿度的急剧变化造成“结露”现象。

Transportation and storage

During the transportation and storage we should pay attention to these aspects:

Hoisting: Suitable lift appliance is recommended in the hoisting of steel coils or plates. Using the ware rope only, it is easy to hurt the coils or plates and cause some accident in case of sliding.

Stacking: When stacking coils, it is recommended to put some protective pads under it to prevent denting. For the plates, skids of same height is required to put under the plates at suitable position to share the weight and prevent the shape problem.

Storage: Steel is recommended to store indoors to prevent rusting. If it is stored outdoors, tarp is required. In the indoor storage, the temperature and humidity should be investigated. The rapid changing of them may cause dews condensating on the surface of the steel.



钢材开卷与剪切

开卷：钢卷开卷时候注意安全。开卷时，特别是对高强度钢材开卷时，操作人员请不要站在钢卷的正面，避免钢带弹出造成人员伤害。开卷时，最好使用具有张力系统的开卷机以避免钢卷表面的划伤。

切边：钢材切边或分条时需要选择合适的设备。使用圆盘剪时，圆盘剪应当具有足够的硬度，避免使用时过快磨损影响切边的质量。正常钢材断面应当由明显的光亮带和剪切带。

Decoil and cut of steel

Decoiling: During the decoil process, please pay attention to safety. Decoiling the steel, especially the high strength steel, the operator should not stand in front of the coil ,which may spring out and hurt people. Decoiler with tension system is recommended to avoid the scratching .

Edge cutting : Suitable equipment is need to cut or slit the steel. For the disc shear, it should have enough hardness to avoid wearing out and influencing the edge quality. A normal section of the steel consists of separate and clear shearing zone and tearing zone.



钢材的重取样

如果在使用中对于钢材的性能存在疑问，请联系我们的服务人员。对于材料的性能可以通过再次取样检验的方式进行确认。取样时，为了使样品具有代表性，其位置应当位于钢板或钢带宽度的1/4处。对于卷状交货的产品，应当在离开头部效应后进行取样。样品的大小为450mm × 450mm，其表面应带标记钢材的轧制方向。

The re-sampling

In case of any suspect with the steel, please contact Baosteel's service people. A retest may be carried out to investigate the quality. During the re-sample, the re-sample plate should be cut off in one forth of the width of the plate or sheet. For the coils , the retest should be carried out after cutting of an additional sufficient longitudinal section to remove the coil end effect.

The size of the re-sample plate is suggested to be 450mm × 450mm to meet the size requirement of most test. The direction of rolling should be marked on the plate.



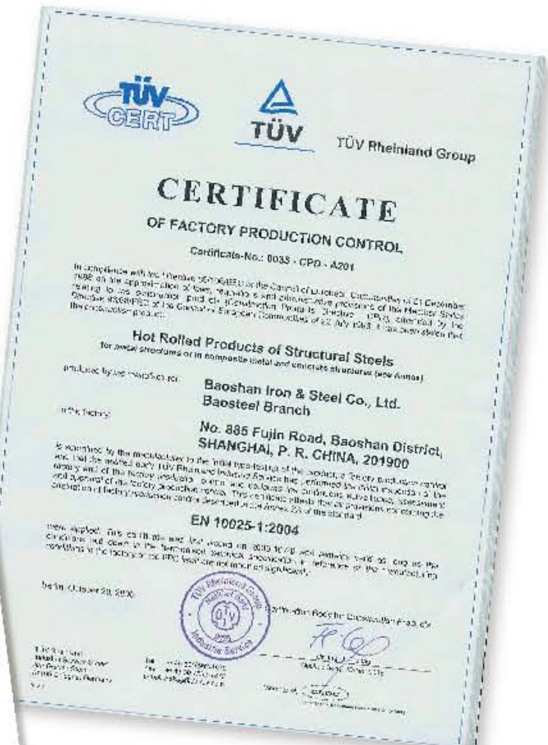
质量保证体系及产品认证
Quality Assurance System and Product Certificate

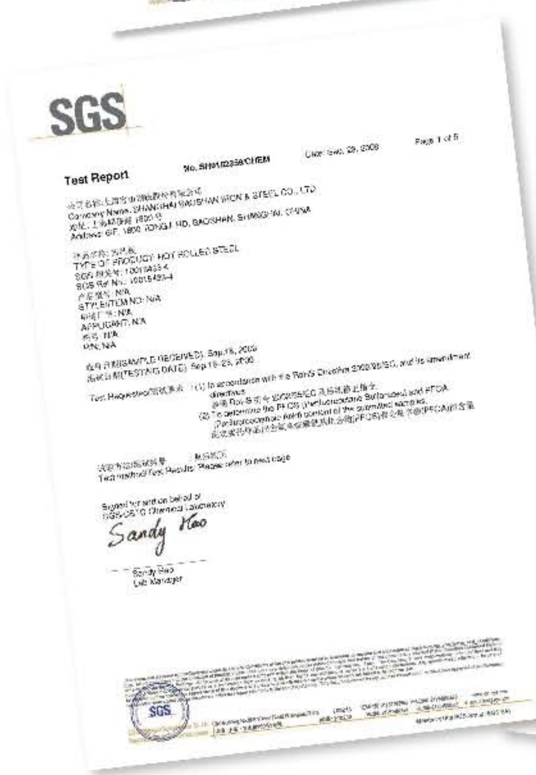
体系认证证书
Quality assurance system

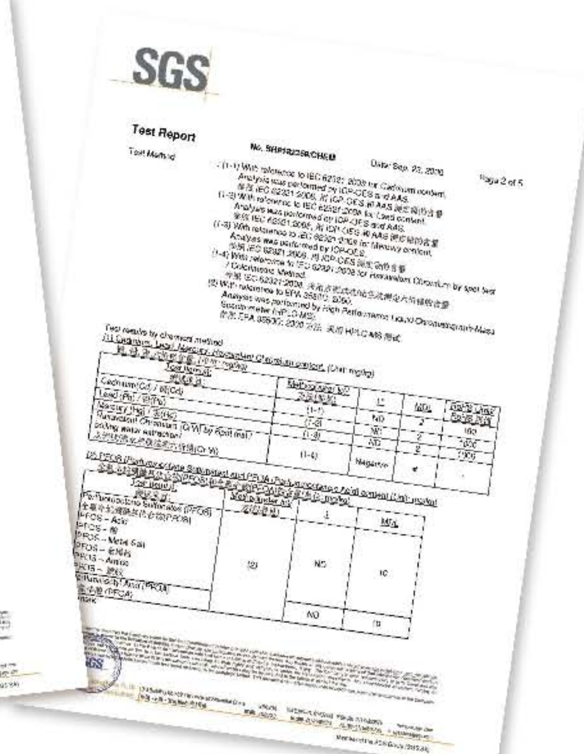


产品认证证书
Product certificates











Control No. : JQCN06003-101G
Date of Issue : August 12, 2009

JQA

JIS Mark Scheme

Certificate of Compliance

Licensee : BAOSHAN IRON AND STEEL CO., LTD.

Address : FUJIN ROAD 885, BAOSHAN DISTRICT, SHANGHAI, CHINA

Certification Number : JQCN06003

This is to certify that the following product which the above company applied for has been complied with the requirements specified in Japanese Industrial Standards (JIS) and relevant Ordinance of JIS Mark Scheme.

Designation of Industrial and Mineral Products for Certification : Steel Products

Division of Certification : Rolled steels for structural purposes

JIS Number and name concerning Certification : JIS G 3101 Rolled steels for general structure; JIS G 3106 Rolled steels for welded structure; JIS G 3136 Rolled steels for building structure

Type or Grade specified in JIS / Range of Certification : Refer to Attached APPENDIX

Factory or Business establishments concerning Certification
Designation : BAOSHAN IRON AND STEEL CO., LTD. CORE BASE
Address : FUJIN ROAD 885, BAOSHAN DISTRICT, SHANGHAI, CHINA

Basic Provision of the Relevant Law concerning Certification : Clause 1 of Article 23 of the Industrial Standardization Law

Date of the Certification Agreement : November 16, 2006
Date of Renewal : August 12, 2009
Date of Expiry : August 11, 2012

OSAMU MORIMOTO
President
JAPAN QUALITY ASSURANCE ORGANIZATION
2-5-2, Marunouchi, Chiyoda-ku, Tokyo 100-8308, Japan

APPENDIX



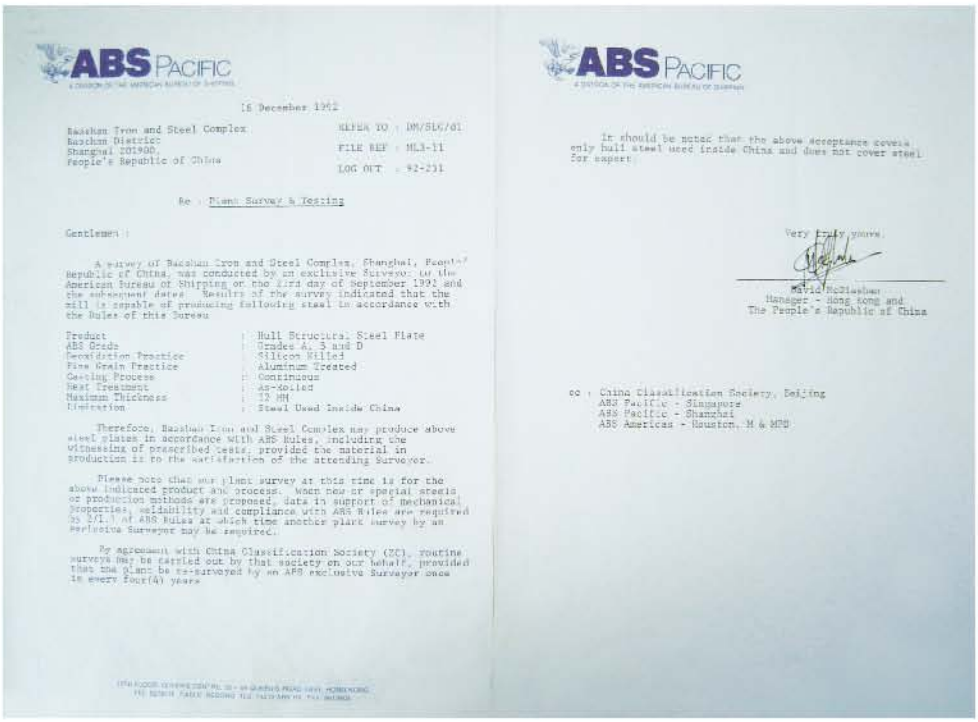
JQA

JIS マーク表示制度
認証書

認証番号 : JQCN06003

附属書

船板认证证书
Approvals of hull structural steel



ABS PACIFIC

15 December 1992

Baoshan Iron and Steel Complex
Baoshan District
Shanghai 201900,
People's Republic of China

REFER TO : DM/SLG/81
FILE REF : ML3-11
LOG OUT : 92-231

Re : Plant Survey & Testing

Gentlemen :

A survey of Baoshan Iron and Steel Complex, Shanghai, People's Republic of China, was conducted by an exclusive Surveyor to the American Bureau of Shipping on the 23rd day of September 1992 and the subsequent dates. Results of the survey indicated that the mill is capable of producing following steel in accordance with the Rules of this Bureau.

Product	: Hull Structural Steel Plate
ABS Grade	: Grades A, B and D
Deoxidation Practice	: Silicon Killed
Fine Grain Practice	: Aluminum Treated
Casting Process	: Continuous
Heat Treatment	: As-Rolled
Maximum Thickness	: 12 MM
Limitation	: Steel Used Inside China

Therefore, Baoshan Iron and Steel Complex may produce above steel plates in accordance with ABS Rules, including the witnessing of prescribed tests, provided the material in production is to the satisfaction of the attending Surveyor.

Please note that our plant survey at this time is for the above indicated product and process. When new or special steels or production methods are proposed, data in support of mechanical properties, weldability and compliance with ABS Rules are required as 2/1.1 of ABS Rules at which time another plant survey by an exclusive Surveyor may be required.

By agreement with China Classification Society (ZC), routine surveys may be carried out by that society on our behalf, provided that the plant be re-surveyed by an ABS exclusive Surveyor once in every four(4) years.

ABS PACIFIC

It should be noted that the above acceptance covers only hull steel used inside China and does not cover steel for export.

Very truly yours,

David McGlashan
Manager - Hong Kong and
The People's Republic of China

cc : China Classification Society, Beijing
ABS Pacific - Singapore
ABS Pacific - Shanghai
ABS Americas - Houston, M & MPD



BUREAU VERITAS
MARINE BRANCH

TYPE APPROVAL CERTIFICATE FOR STEELS

N°AC/RC-06-31-235

Considering the data supplied at the date of this Certificate and the type tests performed, BUREAU VERITAS can accept the use of the steel defined hereafter on board ships and offshore installations classed with the Society.

- Manufacturing Steelworks :	SHANGHAI BAOSHAN Iron & Steel Complex SHANGHAI, CHINA.
- Steel category :	Normal strength hull steel
- Grade and/or trade mark :	A, B & D.
Nature of products :	Plates rolled on hot strip mill

Particulars concerning the above mentioned steels are given in the attached enclosure(s).

The Approval may be reconsidered by BUREAU VERITAS in the following cases :
- significant changes are brought to the steel itself or to its manufacturing conditions
- non-conformities to relevant BUREAU VERITAS Rules are noticed during inspection at works
- anomalies are found when using products made with the approved steel
- products made with the approved steel have not been manufactured, or inspected by BUREAU VERITAS for more than two years

The Approval implies that the products, prior to fitting on board, undergo the tests and inspections requested by the Society Rules. Inspections at works by BUREAU VERITAS Surveyors may be omitted only for workshops awarded with a Certificate of Approval for BV Mode I Survey.

At PARIS LA DEFENSE, on February 18, 1993

For BUREAU VERITAS

J. BENOIT

BUREAU VERITAS
MARINE DIVISION

ATTESTATION

No: BVN0246CK098

Subject : Renewal of Type Approval Certificate
Manufacturer : Shanghai Baoshan Iron & Steel Complex

This is to certify that subject Type Approval Certificate No. AC/RC-06-31-235 is to remain valid as long as the product procedure remains unchanged.

Made at Shanghai, P.R.China
on 15th May 1998

Xu ZhengLiang
Surveyor to Bureau Veritas


CERTIFICATE OF APPROVAL OF MANUFACTURERS OF MATERIALS
中国船级社
CHINA CLASSIFICATION SOCIETY
工厂认可证书
CERTIFICATE OF WORKS APPROVAL
宝山钢铁股份公司宝钢分公司
钢板
STEEL PLATE
PPROVAL CERTIFICATE FOR
IANUFACTURING PROCESS


JQA
JIS Mark Scheme
Certificate of Compliance
Approval of your works for the manufacture of hull structural steel plates
DET NORSKE VERITAS
APPROVAL OF MANUFACTURER
CERTIFICATE
Baoshan Iron & Steel Co. Ltd.
SHANGHAI 201900, China
Steelmaking and Rolled Steel Products

宝山钢铁股份有限公司
http://www.baosteel.com

BAOSHAN IRON & STEEL CO., LTD.
http://www.baosteel.com

薄板销售部
Steel Sheet Sales Department
地址：上海宝山同济路1800号
邮编：201900
电话：021-26643620
传真：021-26645419

产品发展部
Product Development Department
地址：上海宝山同济路1800号
邮编：201900
电话：021-26645554
传真：021-26645299

宝钢服务热线
Baosteel Service Hot-line
800-820-8590
021-26648888

宝钢在线
http://www.baosteel.net.cn

国内贸易公司

上海宝钢钢材贸易有限公司
电话：021-50509696
传真：021-68404616

广州宝钢南方贸易有限公司
电话：020-32219999
传真：020-32219555

天津宝钢北方贸易有限公司
电话：022-84905800
传真：022-84905806

成都宝钢西部贸易有限公司
电话：028-85335388
传真：028-85335680

武汉宝钢华中贸易有限公司
电话：027-84298800
传真：027-84298224

上海宝钢商贸有限公司
电话：021-56121212
传真：021-56126584

上海宝钢浦东国际贸易有限公司
电话：021-36014655
传真：021-51266522 51266533

上海宝钢宝山钢材贸易有限公司
电话：021-36014688
传真：021-51266500

长春宝钢钢材贸易有限公司
电话：0431-85889320
传真：0431-85889317

沈阳宝钢钢材配送有限公司
电话：024-62220699
传真：024-88210198

亚澳地区 Asia and Australia

宝和通商株式会社
HOWA TRADING CO., LTD.
TEL: 0081-3-3237-9121
FAX: 0081-3-3237-9123

宝和通商首尔事务所
HOWA TRADING CO., LTD., SEOUL OFFICE
TEL: 0082-2-5080893
FAX: 0082-2-5080891

宝钢澳大利亚贸易有限公司
BAO AUSTRALIA PTY LTD.
TEL: 0061-8-94810535
FAX: 0061-8-94810536

宝钢新加坡贸易有限公司
BAOSTEEL SINGAPORE PTE LTD.
TEL: 0065-63336818
FAX: 0065-63336819

越南代表处
VIETNAM REPRESENTATIVE OFFICE
TEL: 0084-8-39100126
FAX: 0084-8-39100124

泰国代表处
THAILAND REPRESENTATIVE OFFICE
TEL: 0066-2-6543008
FAX: 0066-2-6543010

欧非地区 Europe and Africa

宝钢欧洲有限公司
BAOSTEEL EUROPE GMBH
TEL: 0049-40-4199410
FAX: 0049-40-41994120

宝钢西班牙有限公司
BAOSTEEL ESPAÑA, S.L.
TEL: 0034-93-4119325
FAX: 0034-93-4119330

宝钢中东公司
BAOSTEEL MIDDLE EAST FZE
TEL: 00971-4-8810788
FAX: 00971-4-8810789

宝钢意大利钢材集散中心有限公司
BAOSTEEL ITALIA DISTRIBUTION CENTER SPA
TEL: 0039-010-530881
FAX: 0039-010-5308895

宝钢东欧代表处
BAOSTEEL CENTRAL AND EASTERN EUROPE OFFICE
TEL: 0048-32-7315012
FAX: 0048-32-7315011

美洲地区 America

宝钢美洲贸易有限公司
BAOSTEEL AMERICA INC.
TEL: 001-201-3073355
FAX: 001-201-3073358

底特律代表处
DETROIT REPRESENTATIVE OFFICE
TEL: 001-248-2089918
FAX: 001-248-2080999

休斯顿代表处
HOUSTON REPRESENTATIVE OFFICE
TEL: 001-281-4847333
FAX: 001-281-4842655

洛杉矶代表处
LOS ANGELES REPRESENTATIVE OFFICE
TEL: 001-949-7526789
FAX: 001-949-7521234

里约代表处
BAOSTEEL DO BRAZIL LTDA.
TEL: 0055-21-25311363
FAX: 0055-21-25310298

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